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Looking from Yerba Buena Island the cantilever span dominates the East Bay Crossing which leads into the city of Oakland.

The entire bridge is too large to be shown well in one picture. The twin suspension spans of the West Bay Crossing overshadow the cantilever and truss spans which may be seen in the background.

The San Francisco-Oakland Bay Bridge was designed and constructed for the California Toll Bridge Authority by the San Francisco-Oakland Bay Bridge Division, Department of Public Works: C. H. Purcell, Chief Engineer.

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For instance, we believe it is the world's most notable bridge — 8¼ miles long between terminals with a length over water of 4½ miles. Yerba Buena Island splits it into two huge structures, a twin suspension bridge and a cantilever structure with truss and girder approaches. It is the world's costliest bridge—\$77,600,000.

It required more material than any other—200,000 tons of steel, 150,000 tons of which are in the superstructure; 1,000,000 cubic yards of concrete; 200,000 gallons of paint.

It rests on more supporting piers — 51 in all — the smallest being as big as a three story house on 100-foot piles. Several, founded on bed rock, go deeper than any piers ever used before — a maximum of 242 feet below water.

The greatest variety of intricate engineering problems were encountered — the deep water, the mud and quicksand bottom, the tides and wind, tunneling through rock, the longest



1935 Cables for the west suspension span, spun into 37 individual strands, completed and ready for compacting.

and heaviest cantilever in the United States, the giant twin suspension span.

The towers over which hang the suspension cables are of cellular construction, and range in height from 470 feet to 515 feet above water. Each tower has about 5,000 tons of steel and required 110,000 field rivets.

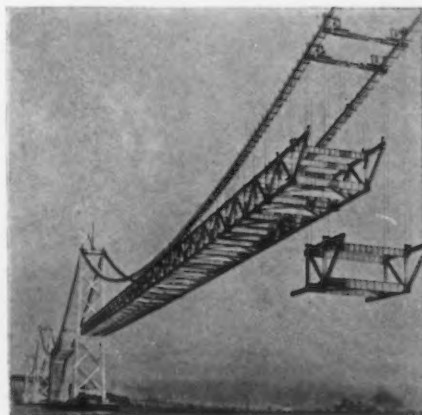
The cables each contain 17,464 wires, 0.195 inch in diameter. Compacted, the diameter of each cable is 28¾ inches. Weight is one ton per foot. Tensile strength of the steel is 231,000 pounds per square inch. Each cable will exert a total average pull of 40,000,000 pounds on the anchor-

ages. The wire would wrap nearly three times around the equator.

The cantilever structure of the East Bay Crossing, with its 1400-foot span and 510-foot anchor arms, sets the record for height, length and weight in this country and is the third longest in the world, exceeded only by Quebec and Firth of Forth.

The bridge has a maximum clearance of 216 feet above low water. Traffic will flow along on upper and lower decks, each 58 feet wide. The upper deck has six automobile lanes. The lower has three truck and bus lanes, and two electric railway tracks. Estimated capacity is 24,000,000 cars a year on the top deck and 6,000,000 trucks and buses on the lower, with loads up to 40-ton trucks and 70-ton interurban cars provided for.

American Bridge Company fabricated and erected the major portion of the superstructure, including spinning the cables. The general contract was placed with Columbia Steel Company. Plain steel shapes and plates were rolled by Carnegie-Illinois Steel Corporation. Cable wire and suspender ropes were manufactured by American Steel & Wire Company. Other materials came from Columbia Steel Company, Cyclone Fence Company, Federal Shipbuilding and Dry Dock Company, National Tube Company, and the Tennessee Coal, Iron and Railroad Company.



1936 Early in 1936, units which combine the stiffening trusses and floor beams, were being raised and attached to the rope suspenders.



1936 Progress view from one of the towers, all steel in place ready for concrete roadways.



Nine months after work on suspension tower number one well on its way sky-

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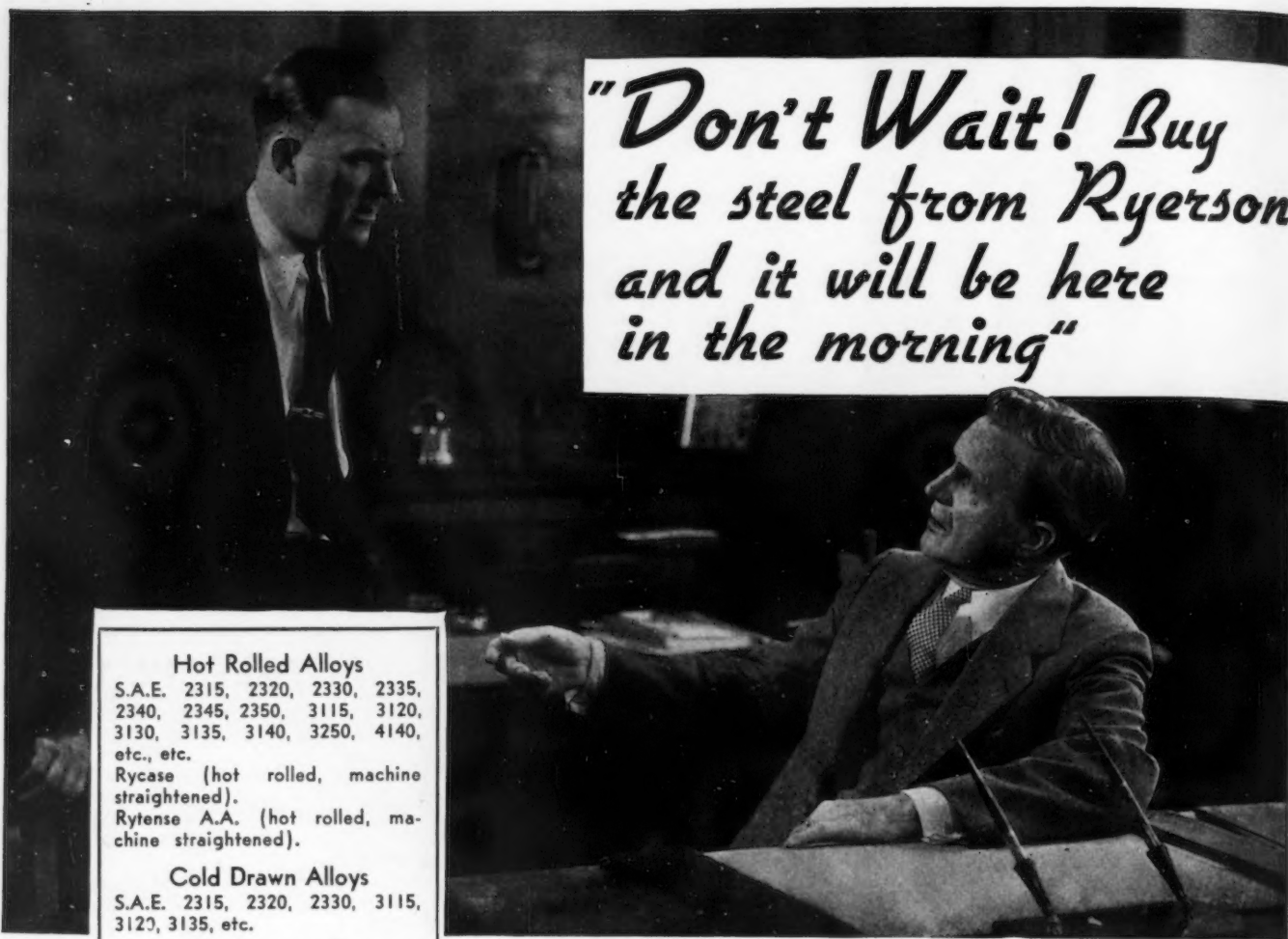
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... THE IRON AGE ...

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NOVEMBER 12, 1936

Vol. 138, No. 20

Charting the Course . . .

It is probably true that a large majority of the executives in industry and business voted for the losing ticket in the past election. That was their right and also their duty, if their convictions so dictated.

It is also true that a vastly greater majority of the American people voted on the winning side. That, too, was their right and their duty.

Majority rule is a cardinal principle of constitutional democracy. And the second most important rule of a beneficent democracy is the protection of the rights of minorities. American liberalism is noted for observing that principle. If proof of this were needed, it might be had in the general unfavorable reaction to the attempts to muzzle the Communist candidate in one or two localities during the campaign.

Business and industry must now chart their course in accordance with the situation. They must chart a course that gracefully and without rancor bows to the expressed will of the people and yet is best calculated to preserve those natural rights that are essential to the nation's industrial progress.

This cannot be done by adopting or continuing an attitude of antagonism. Four more years of cross-purposes between Government and business would be damaging to both parties. Particularly damaging would it be to business, in view of the size of the recent verdict. One need not apologize for having fought when there appeared to be some chance of winning, but one is foolish to continue a battle that has been decisively fought to a conclusion.

What then is the answer for business? Is it surrender? By no means. We do not believe that the President asks or wants business to surrender. What he wants, needs and must have, to accomplish objectives of his Administration, is the cooperation of business in the attainment of certain definite ends. These main objectives, the accomplishment or non-accomplishment of which will stamp his Administration either as a success or a failure, are: Reemployment of the idle in private enterprise, fair and square treatment of labor by employers, the maximum wages that can be paid and the greatest degree of individual security in old age or in unemployment that can be attained.

If, in return for the cooperation which business gives to Government in these attainments, its comments as to practicality of methods of achievement are welcomed and its constructive criticism considered, there need be no great apprehension for the future by those of us who were numbered on the losing side.



ADVANCED MACHINE TOOL APPLICATIONS AT PACKARD

Part One

By F. J. OLIVER

Detroit Editor, The Iron Age

THE first of a series of two articles describing unusual operations in the manufacture of the cylinder block, crankshaft, connecting rods and pistons for the new Six.



CONSIDERED one of the most conservative of the automobile makers, the Packard Motor Car Co. in recent years has shown an aggressiveness and a willingness to experiment that has few equals in the industry. Producing and selling the Packard "120" on a real volume basis was the first sign of a rejuvenated organization. This new model year the challenge is carried by a low-priced Six. To produce this car meant buying practically all new equipment for motor block and component parts. Faced with a situation of this kind the com-

pany's mechanical department could do one of two things: follow conventional practice in laying out operations and play safe, or step out ahead of the crowd and adopt some new ideas, many of which were being offered by the machinery builders. Packard has done the latter.

Cylinder block operations have become fairly well standardized in recent years. So have those on crankshafts, connecting rods and pistons. Packard hasn't suddenly thrown tradition into the discard, however, but here and there it has cut loose from accepted practices and is now doing things differently and at less unit cost.

A case in point is the method of finishing the top and bottom of the blocks both for the 120 and the Six. Formerly a drum-type miller was employed on the 8-cylinder block. Now the blocks are broached, the first application of its kind in the industry. Broaching of cylinder blocks is not new.

Bearing locks and odd surfaces like water pump seats have been finished that way for several years. In fact, Packard broached the bearing locks on the 120 last year. What Packard has done is to broach very large surfaces, necessitating enormous broaches supported in huge machines supplying plenty of hydraulic power and special means of clamping the work to resist the work forces set up. Perhaps Packard would not have accepted the idea if the Cincinnati Milling Machine Co. had not invested a considerable sum in an experimental machine to demonstrate that such broaching operations are feasible on a large scale.

Pan Rail and Bearing Cap Seats Broached Simultaneously

There are two Cincinnati Hydro-Broaches in the new Packard line. One of them performs the first operation on both the 6- and 8-cylinder blocks. This operation is to



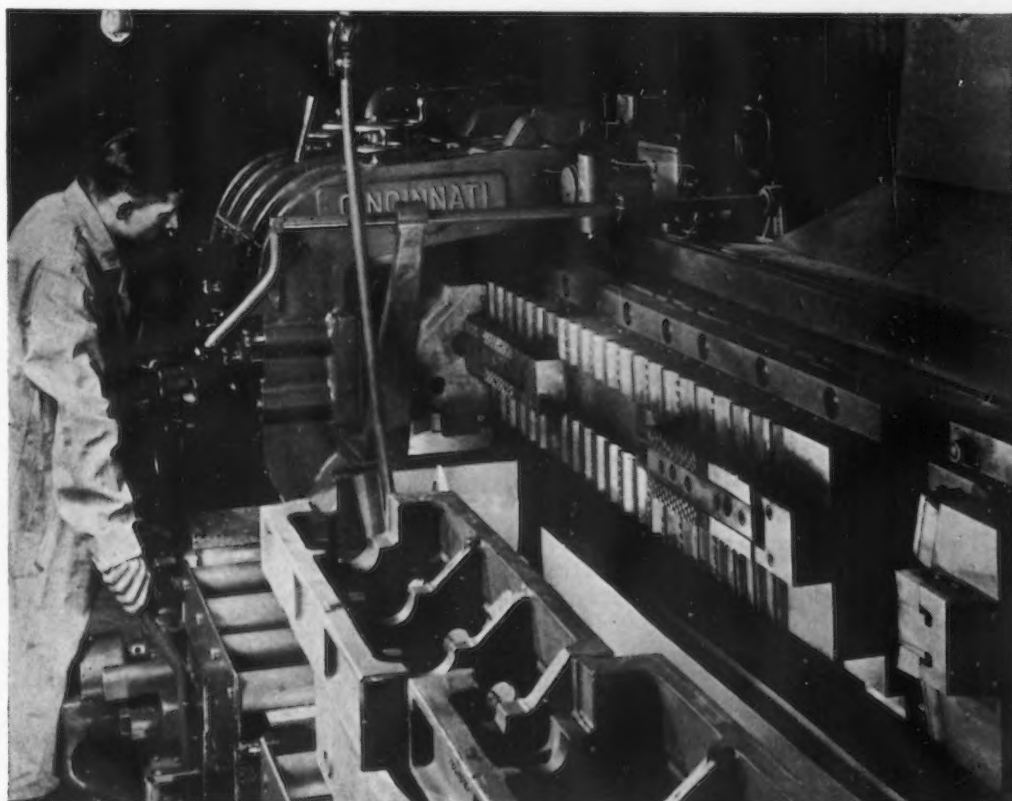
o o o **F**IRST of its kind. A giant Cincinnati Hydro-Broach for broaching in a single operation the pan rails and main bearing locks. A similar unit broaches the top of both 8 and 6-cylinder blocks. o o o

broach the pan rail and the bearing cap seats simultaneously. The rough blocks reach the machine on a roller conveyer in the topside down position and in any order, since the fixture is designed to accommodate either block. The height of the block is the same for both. In the vertical position the block

is clamped by hand against five "foundry" spots, and then the entire work-holding fixture is indexed 90 deg. to the operating position. This action is accomplished by hydraulic plunger, rack and pinion through a hydraulic circuit separate from the broach circuit. The fixture is then locked in position

by two hydraulically actuated clamps. Broaching then proceeds.

The broaches are carried in a horizontal holder in a vertical plane so that chips may readily clear the work. Wire brushes clear the teeth as they leave the work. This holder is in reality the side of a hydraulic cylinder which



o o o **C**LOSE-UP of the horizontal broach bar with inserted blades for finishing the side rails and broach inserts for the bearing seats. The fixture has been rotated 90 deg. from its loading position and clamped hydraulically. o o o



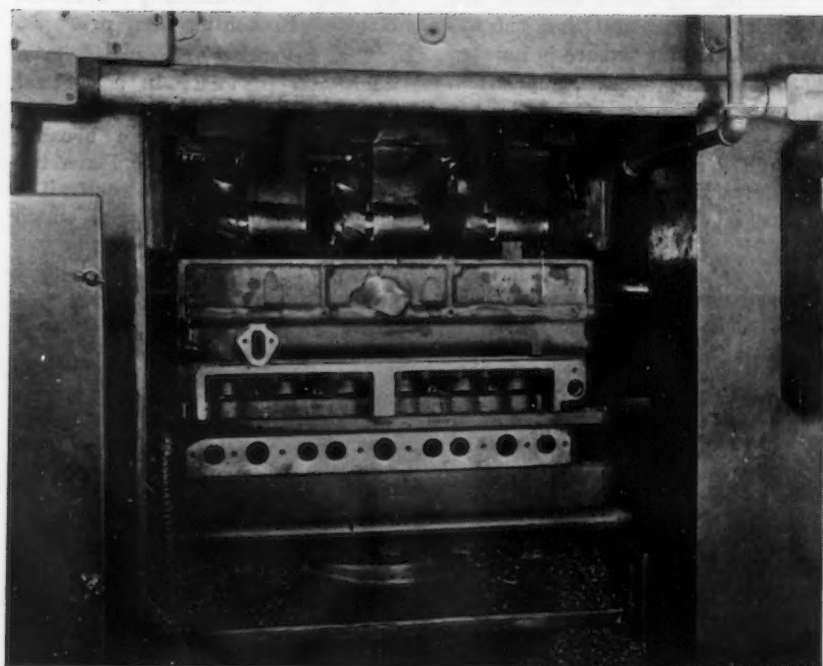
IN this Ingersoll cam and crank boring machine, core drilling, semi-finish and finish boring is accomplished in three steps. Cycle is completely automatic, including shifting of the block from station to station and hydraulic elevation and clamping in the work position.

o o o

bearing locks there are 12 large broach inserts, four in each of three sections. They are of the same material mentioned above.

Top of Block Involves Heaviest Broaching

A similar machine is used for broaching the top of the block, except that in this case the cutters extend the full width of the broach bar and are set at an angle of approximately 30 deg. to the vertical to ease the load. Set-up of the blades is similar, there being four sets of roughing blades containing 39 in all. The last finish insert is tipped with tungsten carbide. This is probably as heavy a broaching operation as is known, since these cutters must operate on the full width of the top of the block. Since there is a tendency for cast iron to chip at the edges when broached, a lip has been cored in each cylinder bore and it is subsequently removed in the rough boring operation. Any chipping that does occur cannot



floats on a stationary ram and piston. It is guided in its travel at both top and bottom. Three 30-hp. Vickers constant-volume pumps operating in parallel supply the hydraulic power. Pressure on the line varies from 600 to 1300 lb. per sq. in., depending upon the sharpness of the tools.

For the pan rails, the broach cutters are of the inserted-blade type, all ground to the same height for simplicity in resharpening.

They are set into the broach bars in sets of three in slots varying in depth to provide the cut differential. Some of the blades are plain, others serrated to break up the roughing cut. All blades are made of a special grade of high-speed steel known as Naloy, and supplied by the National Broach & Machine Co. The last blade on each side is tipped with Carboly and gives a fine shaving cut which leaves an extremely smooth finish. For the

extend into the bore. Fixture design and operation is also similar to the first set-up except that a torque-type electric motor is used for clamping instead of by hand.

While it is yet too early to make any statements regarding cutter life, it is definitely known that cutters can be changed in approximately two hours owing to the simplified set-up that has been adopted. Over the former method of producing the 120 block, produc-

tion has been stepped up from 20 an hour to 50-55. The number of set-ups is the same, since previously there was one milling and one broaching operation required.

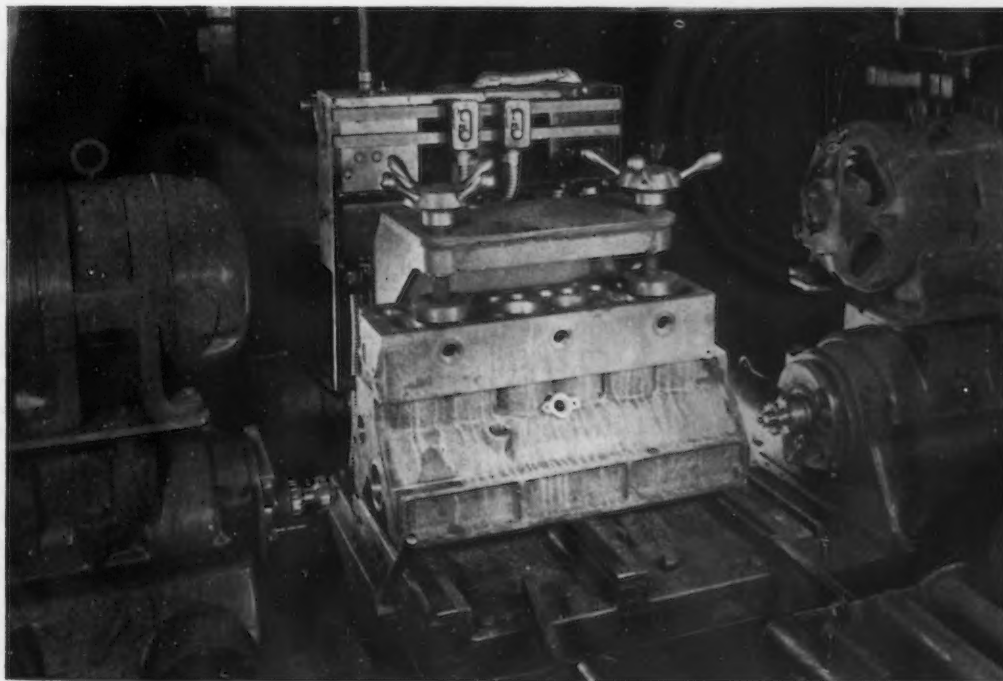
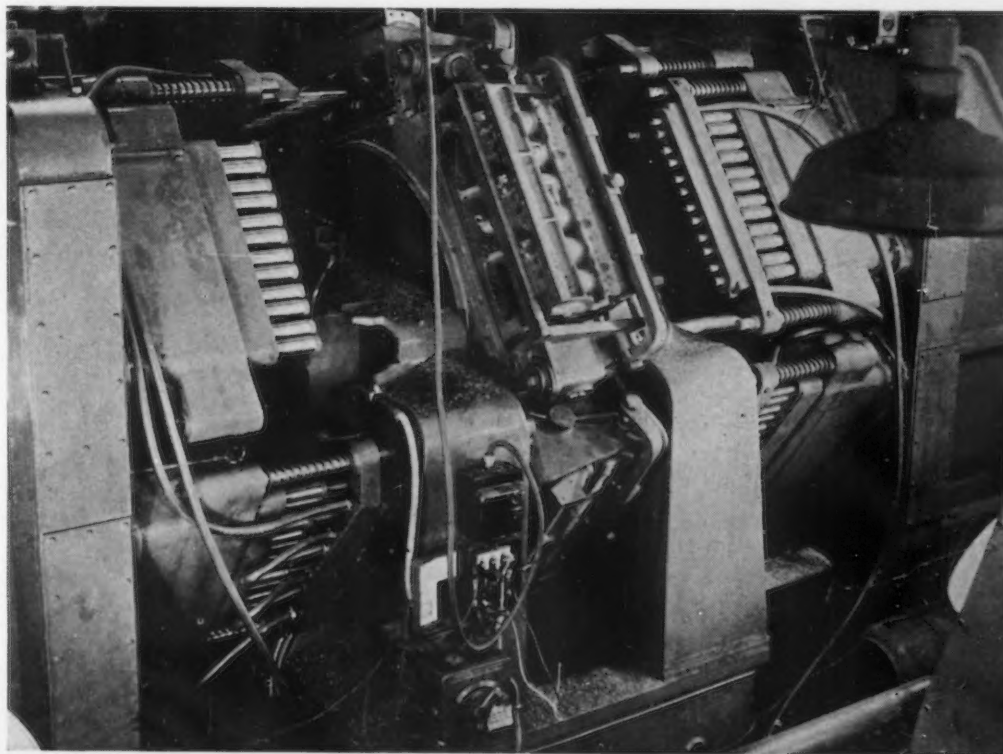
In between these broaching operations the distributor fuel pump and generator pads, as well as the manifold and valve cover faces, are milled in a single set-up in an Ingersoll four-spindle miller. The fixture is mounted on a screw feed table and is guided at the top from

the cross bridge between heads of the machine. Hand clamping is employed through large capstan wheels. Haynes Stellite J-metal is the material used on the inserted-blade cutters. Another milling operation follows this one in a second Ingersoll machine, which provides a planetary motion on one head and a straight across motion on the other. The planetary motion enables the cutter to encircle the bearing housing half. On this

○ ○ ○

CLOSE-UP of the drum-type fixture of a Baush multiple-spindle, double-head hydraulic unit in which 160 tools drill and ream all valve guide and tappet holes at a single setting. A duplicate machine drills, reams and taps the oil pump and distributor clamp screw holes.

○ ○ ○



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IN this Newton planetary miller, the front crank bearing is straddle milled on both sides and an oil sling groove is cut in the bearing housing. All cutters are carbide tipped.

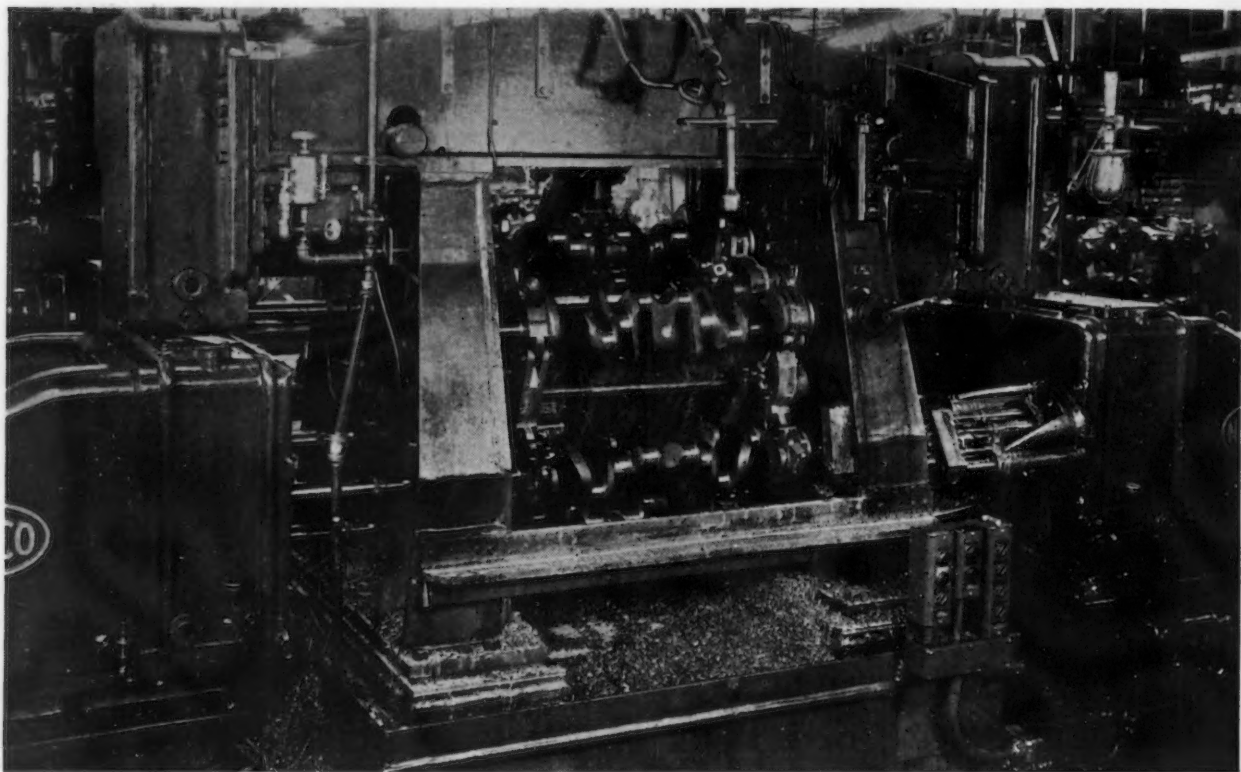
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machine there is also an angular head set at 65 deg. to mill the oil pump pad. Both J-metal and carbide-tipped cutter blades are used.

Following the broaching of the top, oil gallery holes are drilled in a Baker 2-way hydraulic machine. Then follows rough boring of the cylinder holes and milling of the angular valve clearance in two separate set-ups in Ingersoll machines. Then comes a series of drilling, reaming and tapping of a

the roller conveyer at the first station. A hydraulically-actuated pusher bar moves the block from station to station and aligns it approximately under the locating dowels that engage the pan rail. With a block at each station hydraulic plungers raise the work to the operating position and clamp it during the cutting cycle. In a set-up of this kind each hole is bored by heads with right-angle drives so that the entire accuracy

multiple tool heads and five work-holding fixtures on the drum. They weigh 70,000 lb. apiece. In the first set-up the oil pump and distributor shaft holes are drilled, bored and reamed and the distributor shaft hole is later counter-bored. A number of holes are also drilled and tapped on the oil pump and distributor pads and the former is also finish spot faced. This particular set-up combines as many operations as are to be found on



IN this Natco 2-way drilling and tapping unit with trunnion-type fixture, holes are drilled and tapped in both ends of the crankshaft and at the flange in a single set-up. This is a six-station machine.

multiplicity of holes in the block in four Natco machines of conventional type, followed by two more drilling and tapping set-ups in Natco machines after the rear face of the front crank bearing is rough milled and the rear bearing locating spots are sawed in a special Newton miller. Chamfering operations on tapped holes, together with assembly of the bearing caps with cap screws, are done by hand with a Hicycle electric tool.

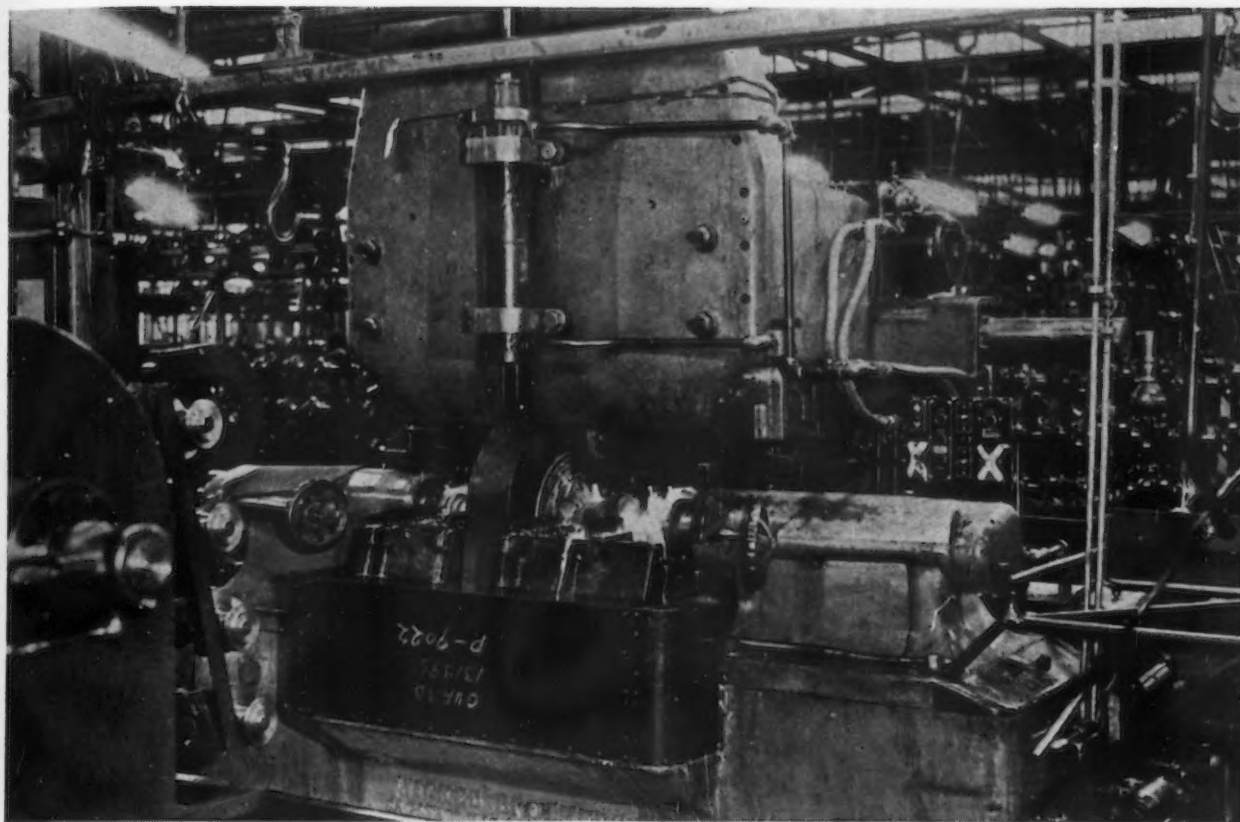
Core drilling, semi-finish and finish boring of the cam and crank bores in a single set-up are performed in a special Ingersoll 3-station boring machine. The machine is completely automatic in operation once the block is pushed on to

depends upon the precision with which the cutter bearing supports are initially line reamed. The roughing cutters are a multi-tooth type cut from solid Haynes Stellite J-metal. The semi-finish cutters and the finish boring tools have two inserted tungsten-carbide blades. A percentage of the output is checked for alinement and if need be, is hand reamed to assure alinement of all the bores. So far this has not been found necessary. In the 120 line the finish boring is performed in a second set-up with conventional boring bars.

Next in line come a pair of Baush drum-type machines, each having two hydraulically-actuated

any of the machines in the new Six line.

In the second Baush machine, which is identical in general design features with the first, the valve throats are core drilled and the valve guide and tappet holes are drilled and reamed. In addition four water circulating holes are drilled. The core drills in this particular set-up are tipped with tungsten carbide. There are 88 spindles in this second unit. Blocks are loaded in both machines in a vertical position by an electric hoist carried on an I-beam circle overhead to simplify transfer of the block between the two units. On the 120 line there are five machines that handle this same oper-



ABOVE

AFTER the crankshaft has been rough turned in the standard center-drive Wickes hydro-lathe, an auxiliary head descends and finish broaches the main bearings. This broach operation, which is performed while the crank is being rotated at high speed, eliminates a rough grinding operation. The economy of this single set-up for a dual job is obvious.

ation. It was intended at first to include also a spot facing operation on the valve spring seats, but because of an engineering change in the diameter of the seats, this was found impractical in the Baush set-up. Hence this work is done later in an Ingersoll six-spindle facing and chamfering machine after the cylinder bores have been chamfered in a Moline drill press. A similar machine is also used to finish line ream the valve tappet and valve guide hole.

Straddle Milling Cutters Carbide Tipped

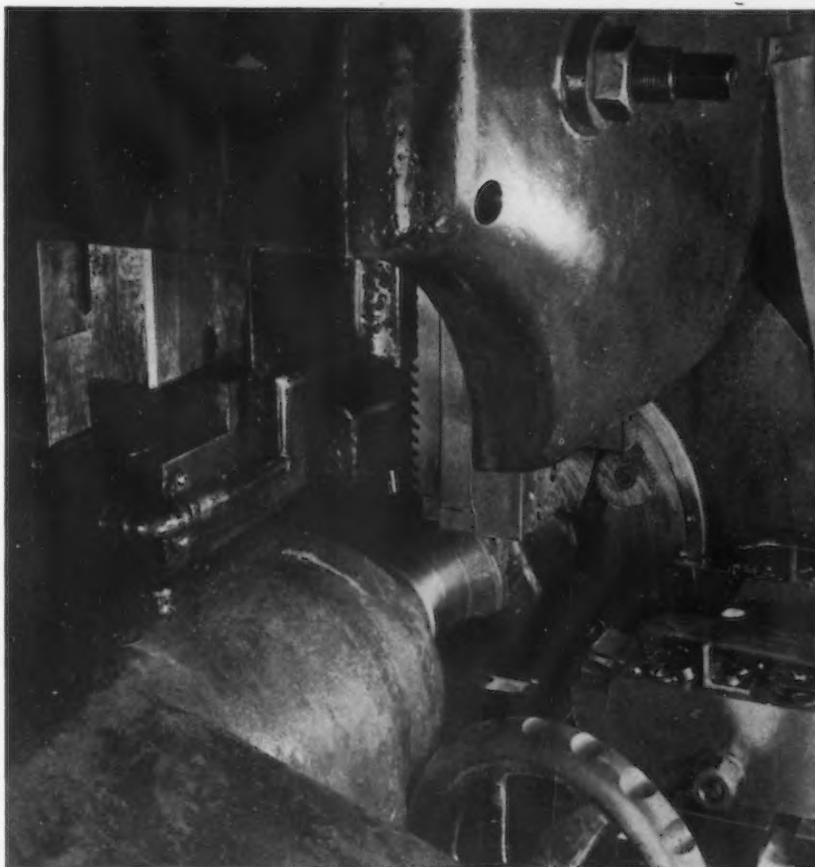
Next in order comes a planetary milling operation of the front crank bearing on both sides, together with milling the chamfer and oil sling groove in a Newton

(CONTINUED ON PAGE 116)

o o o

AT RIGHT

CLOSE-UP of the crankshaft broach. As the straight cutter is pulled upward on the feed stroke, the entire head is fed into the work by rack-and-pinion actuated screws operating on the crosshead seen at the left. Coolant jets under high pressure force the chips out of the teeth. Lathe tools are at the right.



ZINC-ALLOY DIE CASTINGS PROMINENT *in* 1937 CARS

By HERBERT CHASE



PROBABLY no exhibits of industrial products attract such general and nation-wide attention as the annual automobile shows. They are significant not only to the industry directly involved, but to scores of other industries. They more or less set the style for certain other industries or groups of manufacturers who make no automotive products, as is witnessed, for example, in the uncounted "streamline" models of this and that product offered today. For this reason, the progressive manufacturer follows the details of the products offered to see whether any of the new ideas incorporated or materials used offer possibilities of adaptation to his own lines. It is helpful, therefore, to consider some of the more important classes of products going into the assembled vehicles displayed; to note how they have changed over recent years and why they have gained or lost in importance.

For consideration in this article, die castings are selected, as they constitute one of the several important groups of parts. Even the casual observer who knows what a die casting is must be impressed by the extent to which they enter into the modern car. They are employed, of course, because, aside from meeting structural and other general requirements, they are inexpensive. The basic materials, which are largely the zinc alloys, are moderate in cost, and the castings are made rapidly, accurately, with surfaces of remarkable smoothness and requiring a minimum of machine work to suit them for assembly into the finished product. Many extremely complex castings are employed, but a large proportion are of simple though irregular shape. They are thus readily adapted for use in either mechanical parts, which may be hidden, or in decorative parts which are accented to contribute to the beauty and public acceptance of the complete car.

This year, the die-cast, zinc-alloy radiator grille continues as the most conspicuous die-cast element. It appears in most attractively plated forms but on a somewhat smaller number of models than last year. This is because certain conceptions of front end styling have changed and because facilities for the production of die castings of this relatively large size are still quite limited and have not kept pace with production requirements. That such grilles have been entirely satisfactory and have proved a definite sales asset, is proved by their continued use by the largest of past users, such as Oldsmobile, Buick and Nash and on the LaFayette, which is in the lowest price range of cars with die-cast grilles. Chrysler models have dropped the grille proper, in die-cast form, but have added long die-cast, ski-shaped louvers which, in effect, form the upper portion of a grille and serve also as an attractive and striking ornamentation for the lower edges of the central hinged

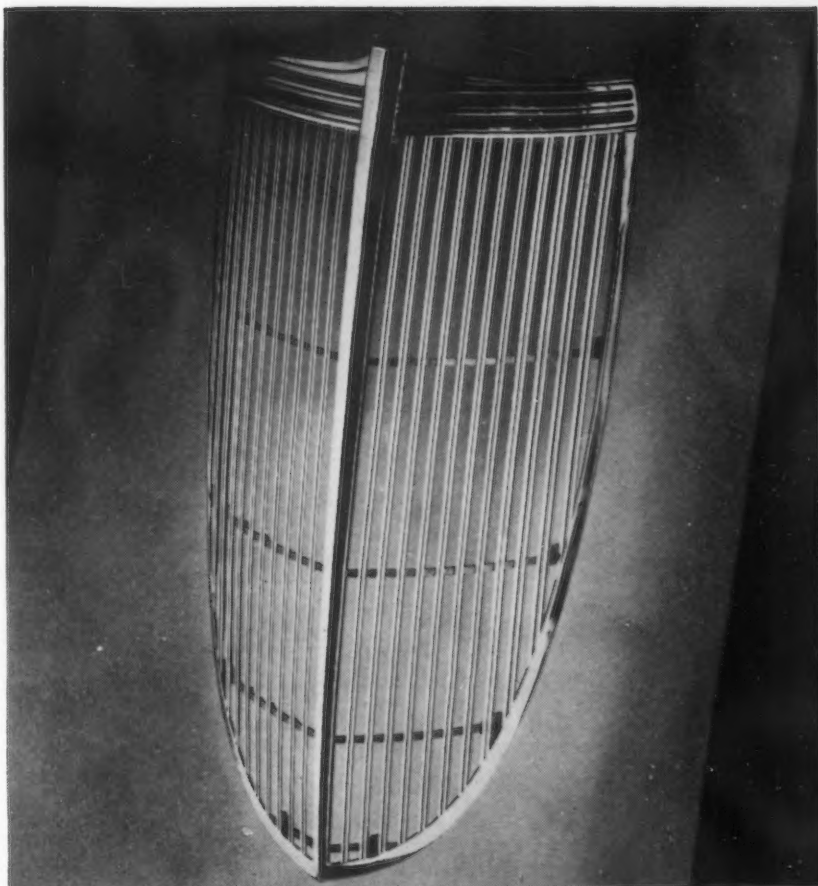
portion of the hood. These castings are some 56 in. in length, yet weigh only three pounds apiece because of the light section in which they are cast.

Several other models are equipped with die-cast louvers or their equivalent. These include the Lincoln-Zephyr, Cadillac, Studebaker and the two lowest priced Packards, among others, some of them employing this type of hood decoration for the first time. Several cars which do not have grilles completely die cast have the frame or moldings for the grille produced by this method.

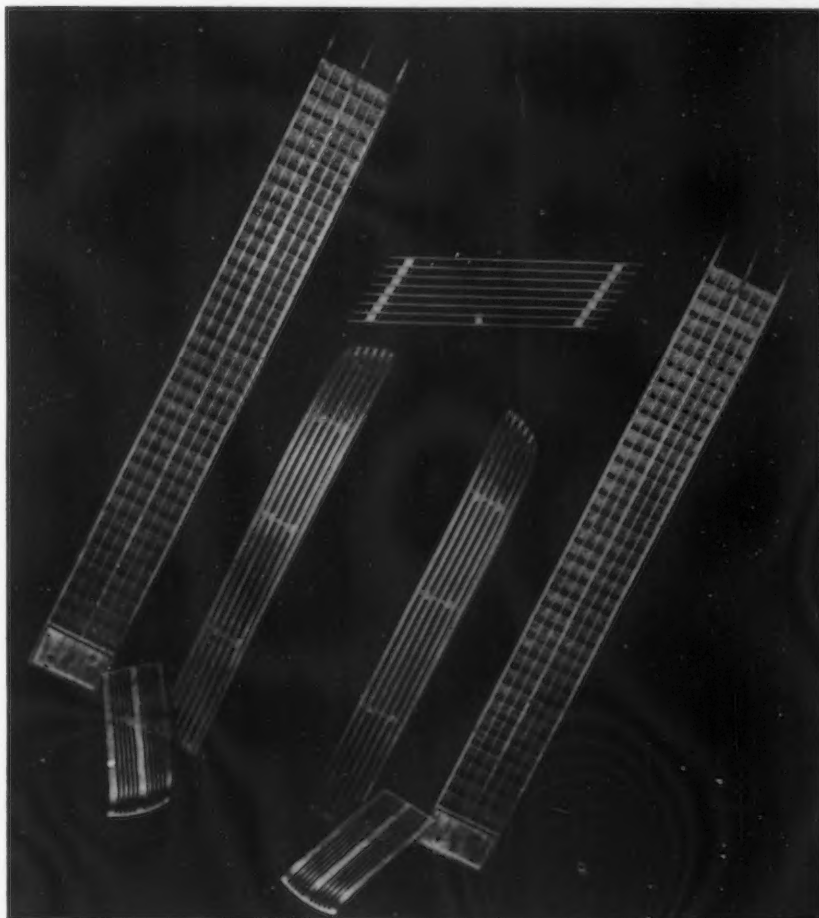
Packard and Cord convertible models are fitted with a still larger zinc die casting than any of the grilles, namely, windshield frames. One such casting, at least, weighs 29 lb. and measures some 50 x 22 in. over all. These are not the first die-cast windshield frames but are indicative of the large size to which this form of casting has attained. It has proved economical to make the very large dies required for a part of this kind, even when the production required is not large, as the saving in finishing over a sand casting, which must be ground prior to plating, is considerable.

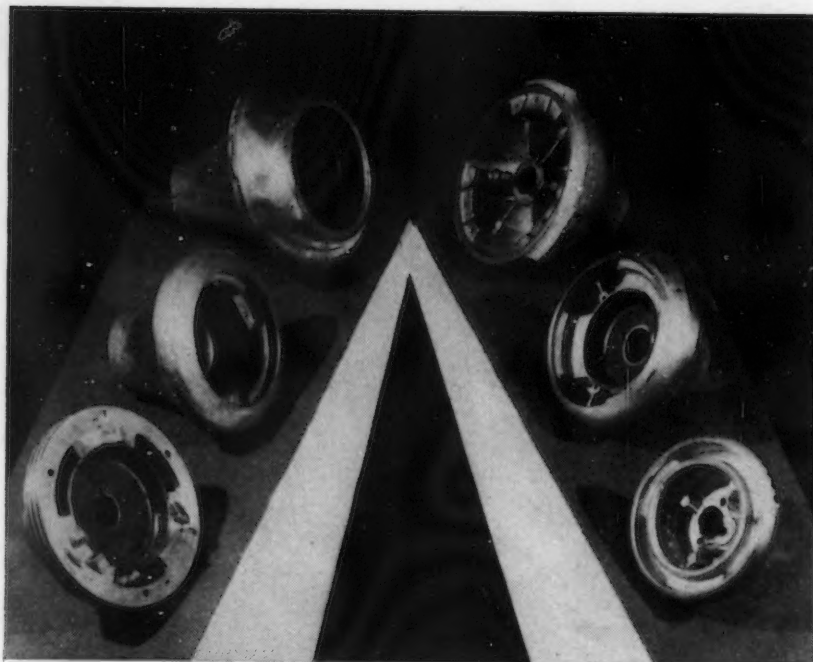
Another important and relatively new application of the die casting, is the hub for the popular banjo type of steering wheel with flexible steel spokes. These hubs range in weight from about 2¼ to 6½ lb. and as the users include Ford, Chevrolet, Pontiac and all the higher priced cars in the General Motors line, as well as Packard, Nash, LaFayette, Hudson and Studebaker, and probably some other makes, the total tonnage of zinc alloy required is large. Originally, the hubs for these wheels were cast in two parts with the spokes clamped between them. Now, most if not all are cast in one piece, but with steel inserts. The latter is drilled at the same time that the radial spoke holes are drilled, and after the spokes are inserted, their inner ends are welded to the steel, forming a strong one-piece assembly.

Brackets for both head and tail lamps are being die cast in large quantities, Ford being among the cars having a tail lamp bracket of this type. Some rear brackets include neatly faired mountings for the license plates and hold the latter where it affords a cleaner appearance and produces less air



THIS smart die-cast grille (Above) appears on the Nash "Ambassador" Six. Die-cast louvers (Below) are popular, such as these used on Cadillac and Lincoln "Zephyr".



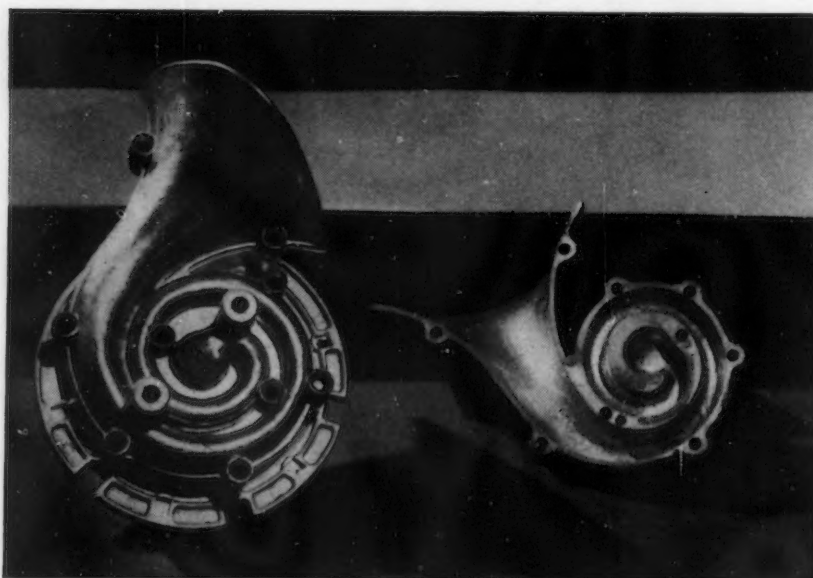


GROUP of several die-cast steering wheel hubs such as serve both ornamental and structural purposes on many of the 1937 models.

resistance than older forms of mountings. Most lamp mountings, including many of an ornamental type for front fenders, are given a streamline form in keeping with efforts to reduce the wind resistance of all protruding parts.

Horns, which in earlier years were usually exposed, are now quite generally concealed so as not to detract from the much desired clean external appearance. Many horns have been die cast in the past

or have had die-cast bells and scroll-like air passages. This year still more will be die cast and those which have been of aluminum are converted to zinc alloys. This not only decreases the cost of the castings but yields the important advantage of better tone quality as a primary reason for the change. Many cars will be fitted with a pair of these horns, including most if not all the models in the General Motors and Chrysler lines, and



COMPLEX die castings for horns. The use of zinc alloy is said to improve tone quality.

therefore accounting for another large tonnage of zinc.

More cars than ever carry unit heaters equipped with motor-driven fans for forcing air through the core and out into the driver's compartment, many of these being provided as accessories at extra cost. Shells, brackets and other parts of these heaters are zinc-alloy die castings largely because of economy in production. Drawn shells of sheet metal would require more expensive dies and would be difficult to make with supporting lugs, whereas the die-casting dies are moderate in cost and the resultant product has integral supporting lugs. It is also easy to finish and does not show a rippled surface or go out of shape if buffed for plating, which are important factors in production economy.

Many supplementary parts for radio installations are also die cast. They include a decorative grille panel for the instrument board in the Buick models. Cadillac is again using an instrument board die cast in one piece but provided with a separate die-cast glove compartment door. This is a long thin-sectioned casting which probably could have been stamped but which would then have required more expensive dies and several operations which the die casting avoids. This year, this panel is being buffed and finished in clear synthetic varnish instead of continuing the pigmented finish with chromium trim used last year. Other cars, including some of the Chrysler line, have die-cast instrument mountings and there are other examples of die-cast parts combining structural and decorative features on and around instrument boards.

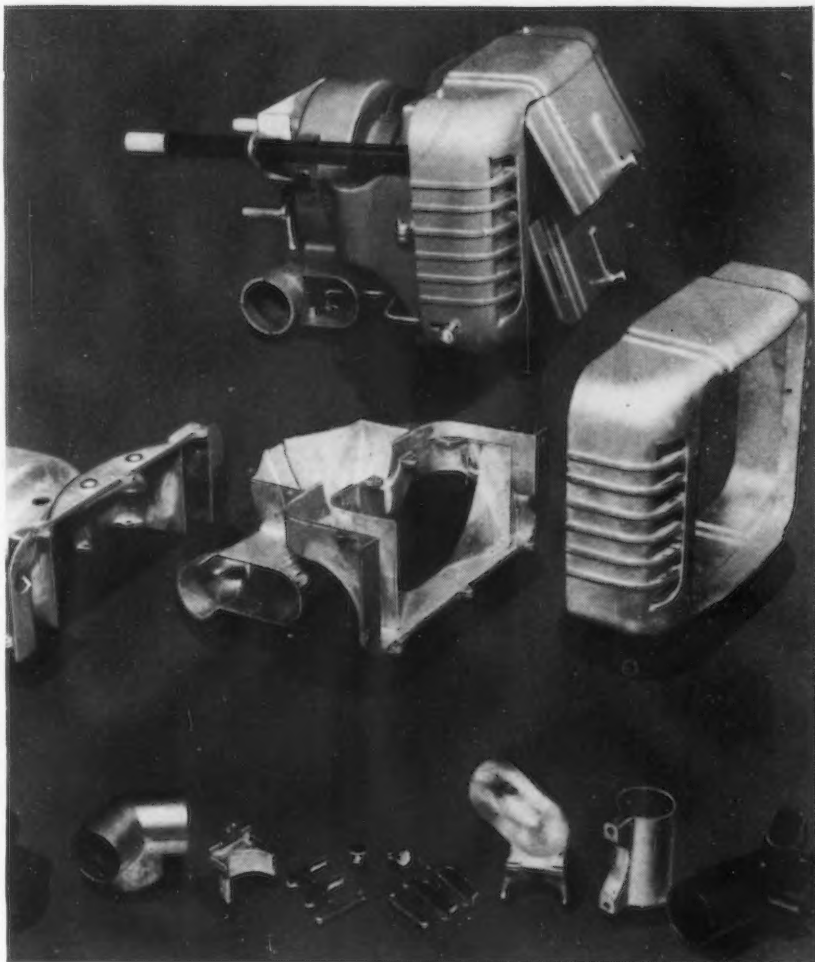
This season, as for many years past, nearly all interior and exterior body hardware, as well as many other decorative parts, are zinc-alloy die castings. The chief differences this year is a marked tendency toward heavier handles, especially for exteriors, to give a more massive appearance in keeping with body lines. Pontiac offers an example of pleasing hardware design in which the "silver streak" motif forms a part of the individual castings. Radiator ornaments have been decreased in size and prominence in some designs but in others are accented and more graceful than ever. Hudson and Terraplane continue the use of ornaments in which the die casting is combined

with transparent ruby castings of the phenolic plastic, Catalin, but the design differs from that employed on 1936 models.

Among the innovations in strictly mechanical parts made in die-cast zinc alloy, that employed in the new Bendix Weiss universal joint is probably the most novel. This joint has forged steel hubs with projecting yokes and has heretofore been entirely of steel, the yokes having hardened curved surfaces for contact with the steel balls which give the universal action and also provide for endwise motion. Such yokes involved a difficult machining operation. As now made, the curved bearing members for the steel balls are machined as separate pieces and are hardened. They are then used as inserts in casting, as is the hub forging, being joined to the latter by die casting the zinc alloy around the unfinished surfaces. Thus the zinc acts as a locating matrix between the steel parts which are held rigidly and in correct relative position by the casting. The temperature rise in the hardened ball races resulting from the casting of the zinc around them is too small to affect their hardness, and the resulting assembly is presumably much less expensive than the former all-steel type. The zinc is so disposed that it is loaded in compression in which its strength is such as to provide an ample factor of safety.

Other die-cast parts performing structural, as opposed to partly or chiefly decorative purposes, include many items such as carburetor and fuel pump parts, windshield wipers, speedometer parts and the like for which die castings have long since become standard through proven economy in manufacture and satisfactory service, thanks in part to the exclusive use of standard alloys of the required purity. Among the newer minor parts now being die cast in zinc alloys, the following may be mentioned: piston rod guide for shock absorbers, door check link, adjustable seat rollers, window regulator parts including bearings hood latch parts and a variety of brackets and attaching members. On some large-production models, the total weight of such minor parts is four pounds or more, hence they are by no means minor in their effect on the total consumption of zinc.

Alloys other than those of zinc



ONE of the popular unit heaters, showing the assembled unit and also the several die-cast parts used in its construction.

base, though having their merits for many applications, show little or no gain over last year in automobile applications of die castings, so far as particulars as yet available reveal. Buick is using, however, some aluminum alloy die castings for valve rocker arm supports,

partly because the temperature in service may exceed that at which zinc alloys are recommended. There is also a considerable use of aluminum alloy pistons in hydraulic brake cylinders, these pistons being die cast in multiple-cavity molds
(CONCLUDED ON PAGE 114)



BENDIX-WEISS universal joint, showing how a die-cast matrix serves to join the steel hub and yoke to the hardened steel bearing races.

FOREIGN TRADE *in* MACHINE TOOLS

*With Particular Reference
to the United Kingdom*

By J. E. LOVELY

*Chief Engineer, Jones & Lamson
Machine Co., Springfield, Vt.*

THIS interesting and timely analysis of foreign trade statistics is from an address before the 35th annual convention of the National Machine Tool Builders' Association, held at Hot Springs, Va., Oct. 5-7. Mr. Lovely emphasizes the importance of foreign trade to the ma-

chine tool industry. He points out that in the past two years United States exports of machine tools have equalled those of 1928 and 1929, and states that it is probable that the present rate of our foreign business will continue throughout another year.

our domestic business. The same thing held true in 1933. This chart is based on members' returns to the Association. Along in 1932 and '33 probably something like 75 per cent of the total amount of business that was done was reported; in 1934, '35 and '36, possibly 90 per cent.

The total export of machine tools from the United States is given perhaps better in dollar figures that date back to 1927. They are shown on Chart No. 2.⁽¹⁾ It is interesting to note that in the last two years our foreign business has equaled that back in 1928 and '29.

Just where this business goes is another thing we are all interested in. Chart No. 3 brings out the fact that at different periods we have had demands from different countries. That always will be so. Right now the biggest demand is coming from Russia and Great Britain. Combined they account for considerably more than half of our total exports. In 1930 and '31 Russia was taking the bulk of it, at a time



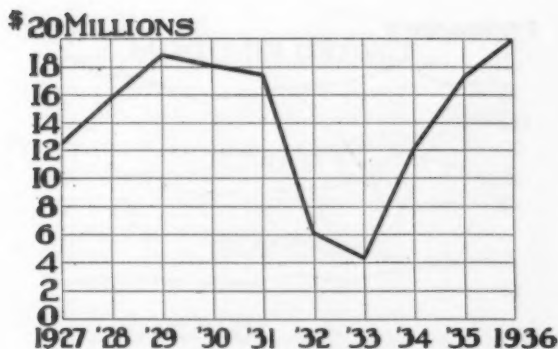
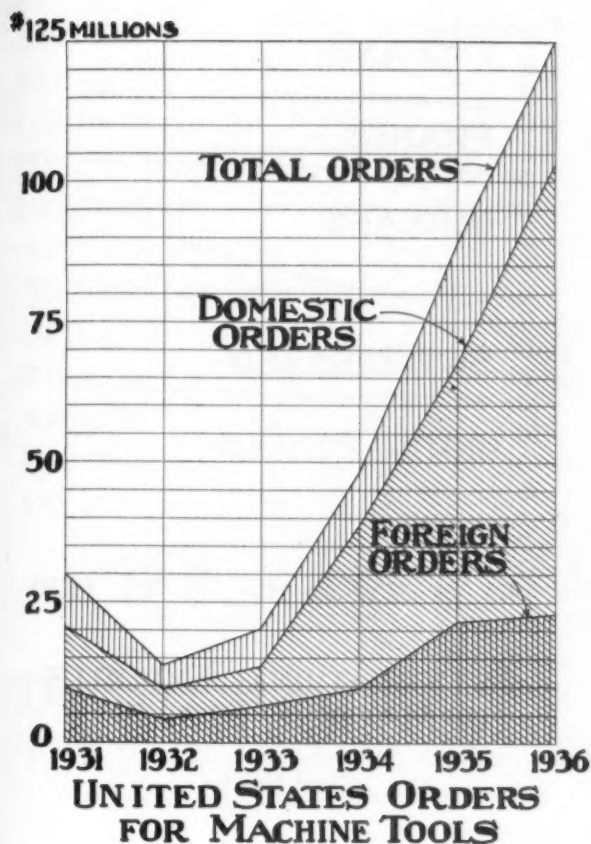
ASKED some time ago to speak on our foreign trade, I wrote to the Association office asking for some information, and I received in response a number of statistical figures that I thought you might be interested in, and I had a number of charts prepared in an attempt to bring these figures out graphically.

I have realized for some time what an important factor foreign trade is to our industry. I have

¹ Source—United States Department of Commerce.

known what it was to our own business and thought probably it meant more to us than to the industry as a whole. I am not sure whether it still does, after reviewing these statistics. When you look at Chart No. 1, showing that during the depression more than a third of our business was for export, you really get a feeling that it is a most important part of our business and that we ought to look at it rather critically.

In 1932 orders dropped pretty low, but of this small amount the foreign orders were almost half of



TOTAL U.S. EXPORTS OF MACH. TOOLS

ABOVE

Chart No. 2

o o o

AT LEFT

Chart No. 1

rate twice as great as a year ago, or at the high point in 1929.

Now let us look at our share of that business, Chart No. 7. Back in 1927 to 1934 it ran from 30 to 40 per cent. During the months of May and June, 1936, Chart No. 8 (the same thing held true for July), our share of the total imports into England was around 60 per cent. As I recall, in May it was 61 per cent and fell to 58 in June and then went to 62 per cent in July.

Chart No. 8 again shows that Germany is our strongest competitor. No other competing country is getting an appreciable share. Switzerland is next with about 6 per cent. We know the machine tool industry in Switzerland is rather small. Business in Switzerland is very poor. One or two or three machine tool plants there are quite busy, but they haven't as much business as they would like and the prices of their machines are high. The business they are getting is about the percentage they are equipped to get.

Other countries, as you will see represented by the small sections, are not a very great factor.

Let's look at the situation in England, Chart No. 9. Before I went to England this summer I had a report that the government was demanding such a large portion of the product of the English machine tool builder that they had threatened to cause the English manufacturers to stop a good deal of their exports so as to use it in the home market. The report I had was that this probably was going to open quite a field for our own exports in other countries to which England had been exporting. With

when England, France, Germany, and other countries were relatively inactive buyers.

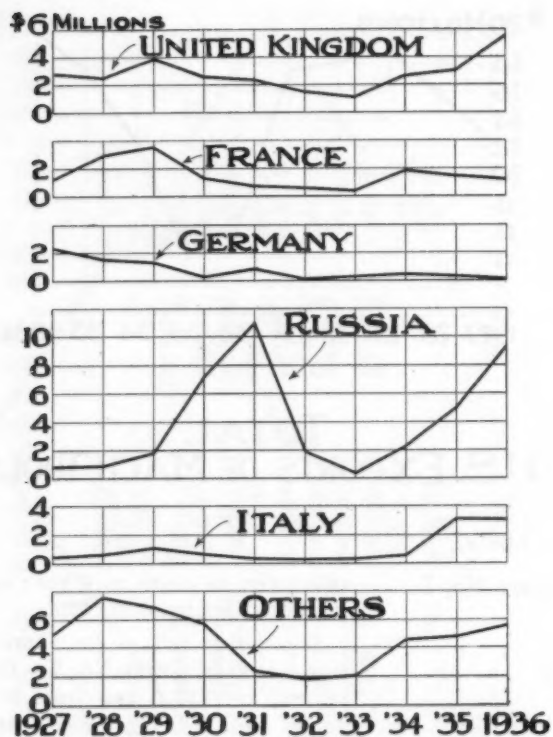
I was requested to deal particularly with conditions in England. Chart No. 3 shows rather quickly and graphically the fact that for some little time our exports to England have not been as big a factor in the situation as they are today. That business, of course, right now is a matter of competition between ourselves and other foreign countries which are producers of machine tools.

Chart No. 4 is made up from the only figures I could get on the foreign trade of other machine tool producing countries, and may give us something of an idea of capacity of others in export. It is very evident that Germany is our strongest competitor. If we take the figures of pig iron production and steel production as indicative of the industrial development in different countries, the picture is something like this: The United States produces about twice as much pig iron and steel as Germany, and Germany produces about twice as much as England. This year Russia is very close to Germany. Her exports probably haven't amounted to very

much, but I think we may look forward with some thought to what part she may take in international trade later on.

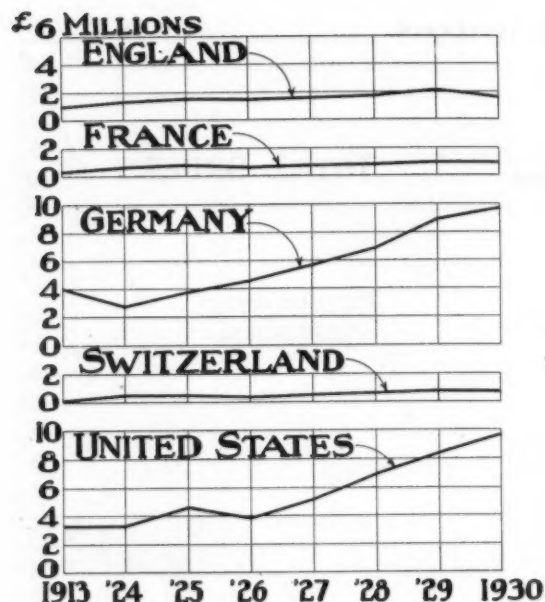
Charts Nos. 5 and 6 show the ratio of exports and imports of machine tools in and out of the British Isles over a period of years, and by months for the year just passed to June, 1936. The broken line is the value of imports in pounds up as far as 1934. I converted that to dollars for the monthly figures of the last year because the foreign exchange ratio has been fairly steady around \$5.00 to the pound, whereas in 1930, '31 and '32 the rate was considerably fluctuating.

If we look at Chart No. 5 we will see that from 1913 to 1934 the exports were way ahead of the imports. Back in 1913 the imports for the whole year were worth only something like £300,000, equivalent at that time to about a million and a half dollars, and climbed in 1929 to close to two million pounds (ten million dollars). In July of 1935 imports were close to \$700,000 a month, close to the average monthly rate for 1929, but in May, June and July of this year imports have reached a total of about a million and a half dollars a month, or at a



U.S. EXPORTS OF MACH. TOOLS

Chart No. 3



INTERNATIONAL EXPORTS OF MACHINE TOOLS

Chart No. 4

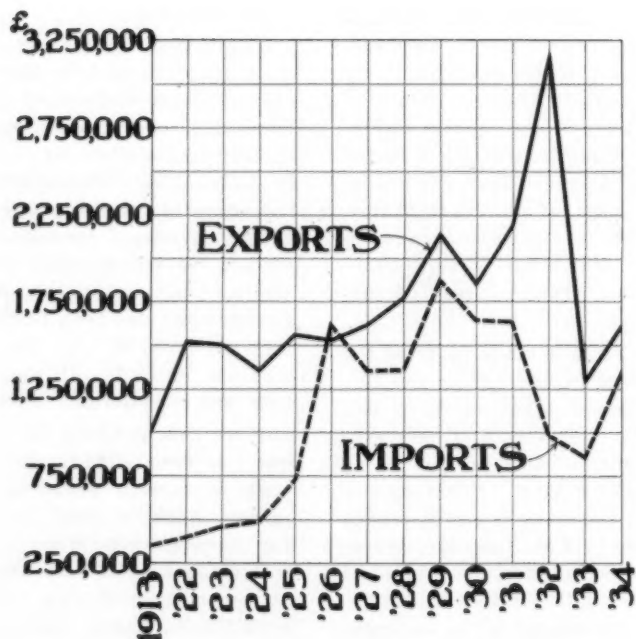
that in mind, it occurred to me that it might be interesting for us to look a minute to see where English exports have gone, or where they are going today.

During May and June 17 per cent went to Italy, 16 per cent to Australia, 8 per cent to India, and about 10 per cent to Russia. France absorbs about 5 per cent. British Isles exports to the Dominions take up about 35 to 40 per cent.

If you will turn back to Chart No. 6 you will find that England is doing quite well in maintaining her rate of export of machine tools. I do not think we can reasonably believe we can take over much of these British markets.

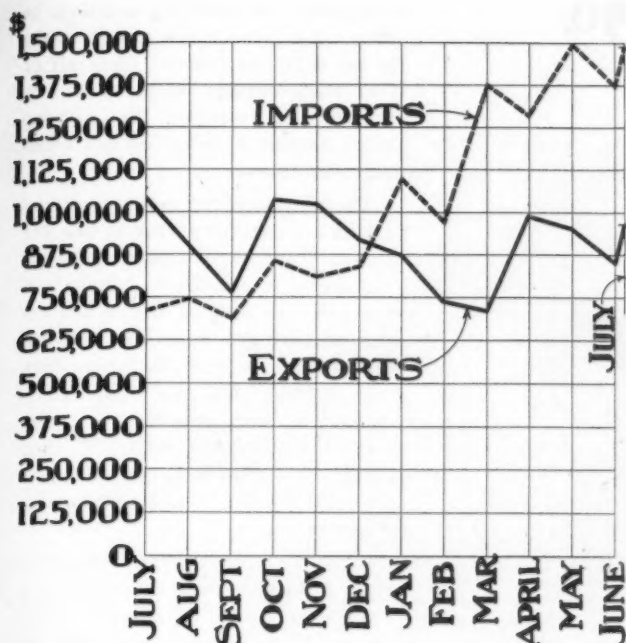
We are interested in seeing just what portion of this total business that is going to England is in the field of manufacture that we are individually interested in. Charts Nos. 10 and 11 were made from tables which were presented in "British Machinery" issues of the last three months.

During May and June the imports into Great Britain from the United States were made up of 21 per cent of lathes, 16 per cent of grinding machines, 14 per cent of milling machines; and all other ma-



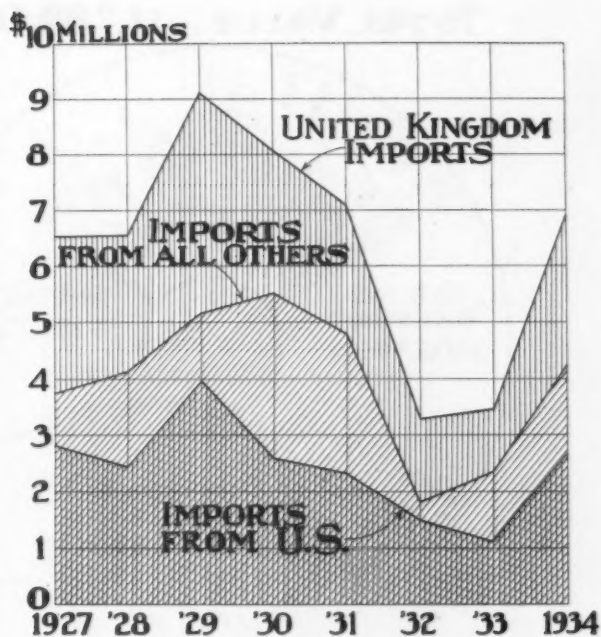
EXPORTS OF MACH. TOOLS MANUF. IN UNIT. KINGDOM. IMPORTS OF MACH. TOOLS RETAINED IN UNIT. KINGDOM

Chart No. 5



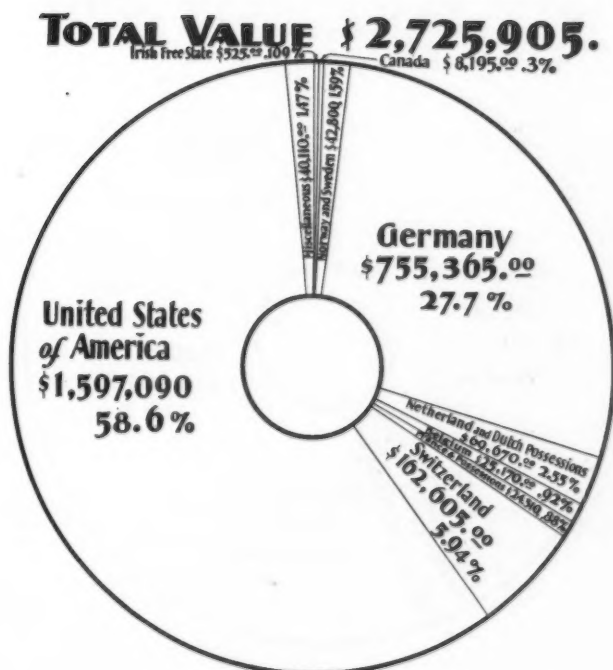
**BRITISH EXPORTS AND IMPORTS
FROM JULY 1935 TO JUNE 1936**

Chart No. 6



**UNITED KINGDOM IMPORTS OF
MACH. TOOLS FROM U.S.
COMPARED TO THEIR IMPORTS
FROM ALL OTHERS**

Chart No. 7



**BRITISH Machine Tool Imports
May and June 1936**

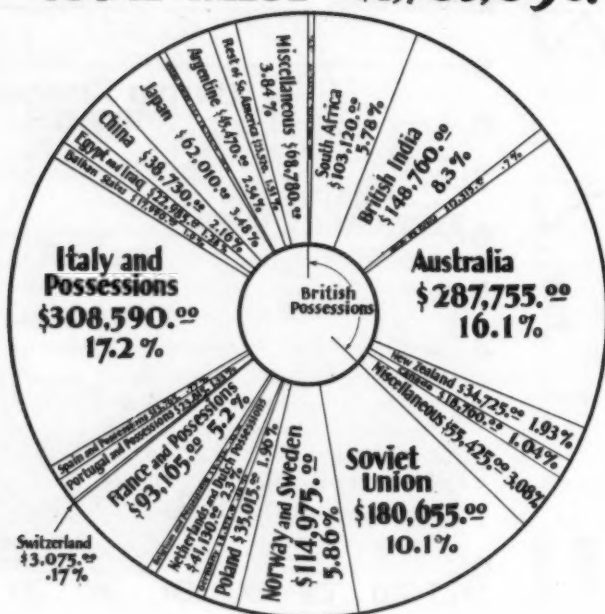
Chart No. 8

chinery 40 per cent. I don't know just how those reports are collected, nor what these "other machines" include. They may include high-production machines or special gun-making machines or various kinds of special machinery.

By referring to Chart No. 11 we may compare our share of imports into Great Britain with that of our strongest competitor, Germany. There is a very small section in the British imports from the United States that includes punch presses and shearing machines. A very large portion of that equipment comes from Germany. In lathes we are somewhat ahead of Germany. England bought \$338,000 from us and \$241,000 from Germany. (These amounts were reported in pounds in the British figures and I have transposed them into dollars at five to the pound.) Out of the total we got about twice as much as Germany.

Naturally we want to know how long this is going to last. Perhaps if we knew what field these machines were going into and how long present conditions would continue in England, we would know the answer. We have the idea that a large portion of this increase in

TOTAL VALUE \$1,789,050.



BRITISH Machine Tool Exports *May and June 1936*

Chart No. 9

imports is caused by the rearmament program that we know is going on in England. I got the impression over there, however, that possibly that wasn't quite accounting for as much of the large increase as we were inclined to believe. I have no figures. I don't know of any figures that are available to prove or disprove my impression. It is apparent, however, that except for the coal and textile industries, all commercial activities in England are going along at a pretty high rate. Conditions in England have been pretty generally prosperous for the last two years.

Construction is still running high. A good many people in England feel that building is being overdone. The banks do not approve of much of it. The work is being financed by houses quite similar to our building and loan associations. However, the terms on which a house may be bought are so favorable that practically all the houses are being occupied just as quickly as they are completed.

There is a large increase in the amount of manufacturing space. You see new buildings being put up everywhere for manufacturing. A large number of the machine tool

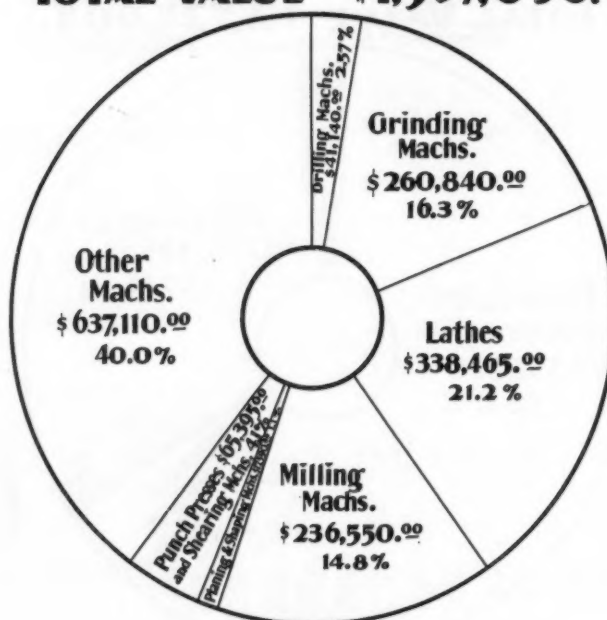
companies are building additions to their plant structures, and it seems to me that the demand from all of this work outside of munitions is probably accounting for a very large portion of what we are sending over there.

The shipbuilding industry is going at a faster clip than it has for years. In fact, England today is building just about as much tonnage as the rest of the world together. We get some idea of what that means in dollars when they are laying down two new battle-ships that may run into \$40,000,000 or \$60,000,000 each. If they build two a year it is equivalent to the total amount of business our industry does.

I don't think we are competing very well with them on machinery for the shipbuilding industry. They are perhaps better equipped to build heavier machinery than we are. They also are more inclined to get machinery of that kind from Germany.

The automobile demand is the one I am most familiar with, probably because the equipment that our company builds is of that particular type. They are building about

TOTAL VALUE \$1,597,090.

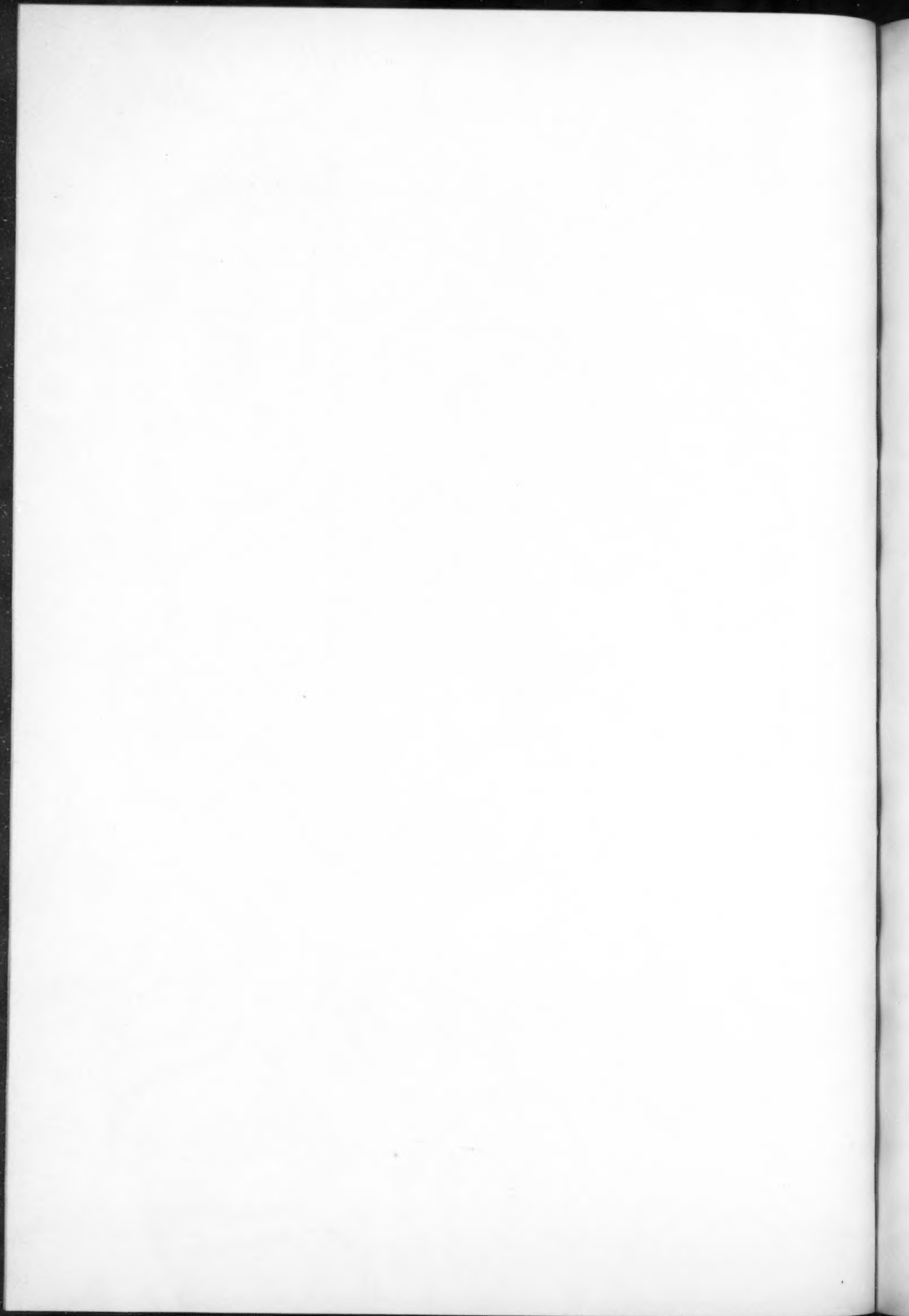


Machine Tools Imported Into GREAT BRITAIN from UNITED STATES *May and June 1936*

Chart No. 10



AMBROSE SWASEY, chairman of the Warner & Swasey Co., has been cited by the board of award representing the country's four founder engineering societies as the second recipient of the Hoover Gold Medal, established in 1930 and "Awarded by engineers to a fellow engineer for distinguished service." The presentation on Dec. 2 precedes by less than three weeks the celebration of Mr. Swasey's 90th birthday, which occurs Dec. 19. Drawn by John Frew for The Iron Age.



one-tenth the number of automobiles we are in this country, so that doesn't, of course, form a market that is comparable to ours. They are feeling very nervous about their position in the air, and are doing what they feel is as much as they can do to put themselves in a better position.

We cannot, of course, expect the present rate of our foreign business to keep up indefinitely, but all the factors I could get hold of indicate it might last another year. They have done a good deal to stimulate imports. One of the most interesting things is that under certain conditions where British tools are not available for long delivery, they will reimburse the purchaser, or the importer, for the duty expended. It seems to be quite easy to get a rebate on the duty if you can prove that the British equivalent is not available in time to permit the purchaser to complete certain contracts he has on hand. That applies with a good deal of force to government contracts. The duty is 20 per cent, as you know, and the duty tacked on to our prices puts us at a very great disadvantage with both Germany and England.

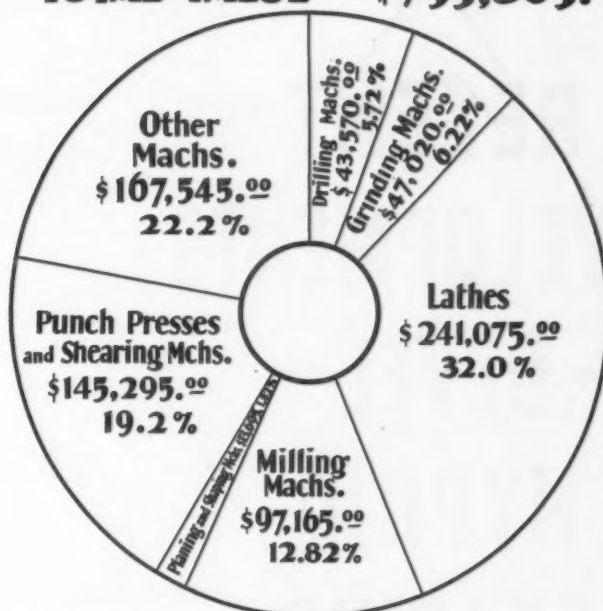
In the field of high-production machinery we should, however, continue to have decided advantage over the British manufacturer as well as the German. We have a big field here in which to develop new ideas and new methods of production in our automobile industry,

and in other large industries, and equipment that has been produced here and tooled up shows up to decided advantage over equipment that has been imported from Germany or which is made in England.

I do feel if we are going to continue our foreign position in ma-

chine tools, when we consider the competition we are getting from Germany and England, that we have got to maintain our superiority in design and our superiority in performance, for we are bound to get very strong competition from both these two sources.

TOTAL VALUE \$755,365.



**Machine Tools Imported Into GREAT BRITAIN
from GERMANY
May and June 1936**

Chart No. 11

RECENT DEVELOPMENTS *in* BEVEL *and* HYPOID GEARING

By A. H. CANDEE

Gleason Works, Rochester, N. Y.

FORMATE gears and the machines and cutters to make them; a spiral bevel gear with "zero-spiral-angle" teeth; a spiral bevel gear jobbing system that makes possible economical small-lot manufacture; and a universal testing machine that permits checking all types of gears for quietness and tooth bearing at operating speeds

are developments outlined in this article, which is from a highly-interesting extemporaneous address by Mr. Candee at the recent convention of the American Gear Manufacturers Association. Several industrial applications, representing advanced practice, are also described and illustrated.

gears of diameters, say, from 2 to 8 ft., with pitches up to 1 D.P. The large generated bevel gear is coming more and more into general industrial use.

Fig. 2 shows a double-reduction, right-angle gear unit in which the second reduction is a pair of the large generated spiral bevel gears. This is a British design for a sugar-mill drive, rated at 1300 hp., the bevel gears reducing from 1000 to 264 r.p.m. The gear diameter is 54 in., with teeth of $1\frac{3}{4}$ D.P. and 7-in. face width. The usual American practice in a double-reduction unit of this kind is to use the bevel gears for the first reduction rather than the second.

Fig. 3 shows the other extreme in the range of spiral bevel gears. This is a pair of angular spiral bevels for the shutter mechanism of a Cine-Kodak, 46.5 D.P. One gear is of brass and the other of bakelite. These represent the smallest spiral bevel gears in commercial production.

Straight-tooth bevel gears have been generated as small as 80 D.P. at the outer ends of the teeth, and



THE accompanying series of photographs and diagrams has been selected to show the development of methods, equipment, and product during the last eight or ten years.

Fig. 1 is a recent view in the Gleason Works shop where large generated spiral bevel gears are cut. This work is done on the planing-generator type of machine, the first of which was put into operation just ten years ago. The machine in the immediate background is the original and, when built, was

designed to cut gears up to 94 in. in diameter. It has recently been rebuilt to increase its range to a diameter of 104 in. The picture shows a cut just started on a large pinion blank for a steel mill job.

The largest gear seen lying on the floor is about 90 in. in diameter, to be used for a boring-mill drive. The pile of gears at the left is for steel-mill work. The smaller ones in the foreground have 192 teeth of 8 D.P. and are used in bevel gear generating machines.

The planing-generator type of machine is used to cut spiral bevel

proportionally smaller at the inner ends.

Hypoid Gears and Industrial Applications

Fig. 4 shows a pair of hypoid gears mounted in a testing machine. This type of gear was developed in 1925 and 1926, and was first used in Packard automobiles. Since then the use of hypoid gears has gradually increased, particularly in the higher priced cars, until now there are about as many kinds of cars using hypoids as spiral bevels for the rear-axle drive.

As you see, hypoid gears appear very similar to corresponding spiral bevel gears, the principal difference being the offset of the axes. In the automobile this lowers the propeller shaft and is thus advantageous in the design of cars with low bodies.

The difference in spiral angle between the gear and pinion can be noticed, which is one of the necessary features of hypoid teeth. The gears shown were generated with the same type of cutter that is used for most spiral bevel gears. In the shop, the work of production is practically the same as for spiral bevel gears.

In Fig. 5 we have four hypoid pairs with the pinions mounted on a continuous drive shaft. These gears were designed for a wire-drawing machine. The mounting of pinions on a continuous shaft is one of the important reasons for applying hypoid gears to industrial purposes.

The other reasons that may be cited are that it is easy to place bearings on both sides of the gear and of the pinion, and that in some cases the lowered or raised position of the pinion allows arrangements of machinery which would not otherwise be possible.

Fig. 6 is a suggested arrangement of hypoid gear units to drive large rolls for paper-drying. Here again the pinions are connected directly in line. In an actual installation, steam was fed to the rolls through the gear shafts, which were hollow. This could readily be done with the crossing of the shafts made possible by the hypoid arrangement. In previous practice the rolls were connected by trains of large spur gears, with idler gears to fill up distances between centers; and there was a large amount of backlash resulting from the many gear contacts. With the hypoid design the backlash for each roll was re-



Fig. 1

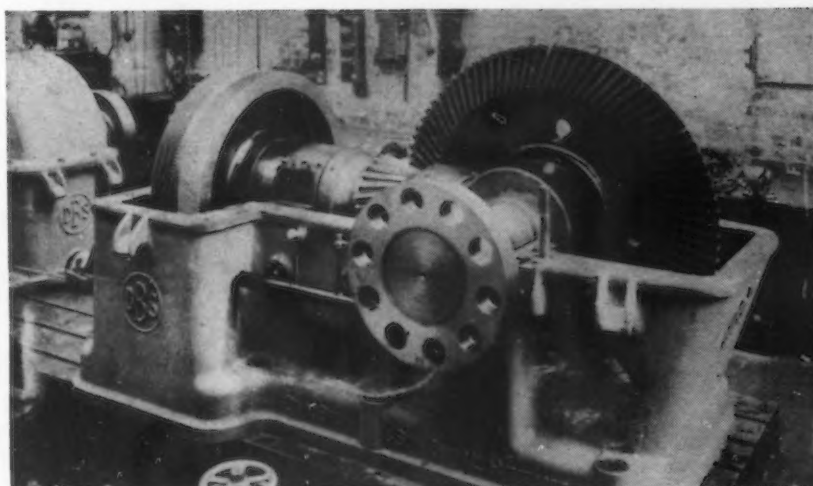


Fig. 2

duced to the amount required in only one pair of gears. Although hypoid gears are perhaps better than spiral bevel gears in smoothness and durability, the determining reason for using them is the general arrangement of the other equipment which they are to drive. When the offset position of the pinion is desired, the gears can be generated with the same degree of correctness and precision as corresponding bevel gears.

Fig. 7 shows a pair of hypoid miter gears as cut on the large planing-generator machines. The teeth appear nearly straight, but do have a slight amount of curvature. In spite of the fact that the number of teeth is 38 in both gears, there is a difference in diameter and a difference in spiral angle. A dif-

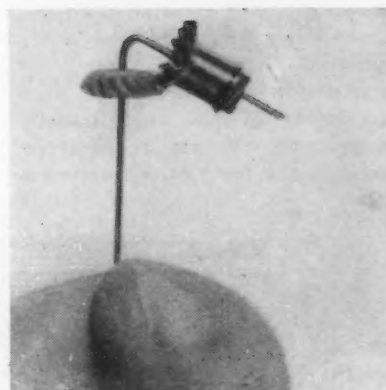


Fig. 3

ference can also be seen in the pressure angles on the two sides of the teeth. The hypoid arrangement consists of an unsymmetrical position of the pinion with respect to the

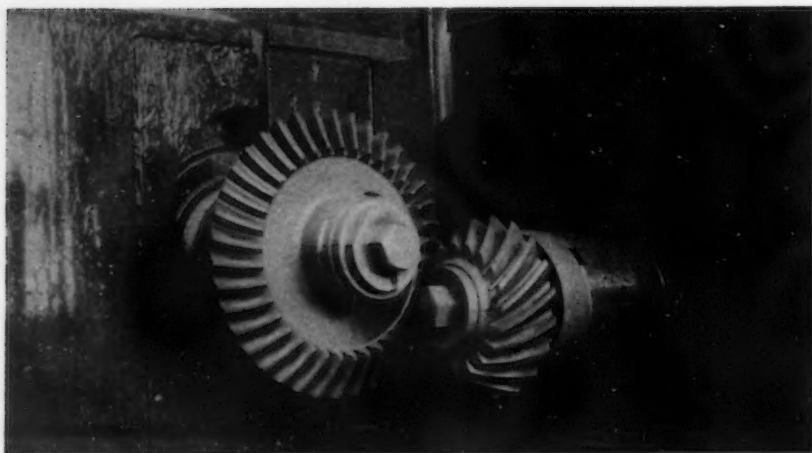


Fig. 4

gear. It is off center; and in order to produce equal arcs of action and equal amounts of tooth contact on both sides, it is necessary in these gears to adopt unsymmetrical pressure angles.

and the gear hobbled. The picture is interesting as showing the very wide range of work that can be done on hypoid generating machines.

Coming to spiral bevel gears in general, Fig. 9 is the spiral bevel

This cutter and the spiral bevel gear generator are the basis for the development of the spiral bevel gear.

Fig. 10 shows the No. 16 generator for spiral bevel and hypoid gears. The cutter is carried on a rotating cradle and has considerable angular adjustability. On this machine we can carry out all the methods of tooth-bearing control which have come to be used in spiral bevel gear production.

Fig. 12 shows a hypoid pinion being cut on the No. 16 generator. The pinion is set below center. The cutter represents a tooth of an imaginary generating gear rolling with the pinion. The axis of the generating gear is, of course, the axis of the rotating cradle. In the figure shown the generating gear has been added to the picture. The position of the cutter on the cradle corresponds to the position of a tooth in the generating gear. This

Fig. 5

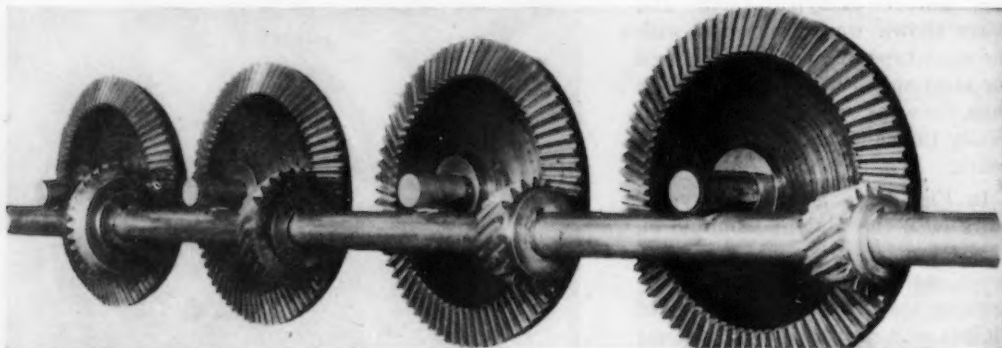


Fig. 8 shows the opposite extreme from miter gears, namely, a hypoid pair with a one-tooth pinion. Such a pinion naturally looks very much like a worm. This pair of gears, however, was generated with the same equipment as that used for the automobile hypoid axle drive. The gear design was worked out for a steering-wheel drive and is actually being used, the pinion, however, being in the form of a true worm

gear cutter as is used today and substantially as developed 20 years ago. It may be described as a face-mill with inserted and adjustable blades. Originally these cutters always had alternate outside and inside cutting blades. At the present time, pinions are frequently finished with cutters in which all the blades are either outside or inside, and the two sides of the pinion teeth are finished in different machines.

conception is the foundation of all determinations of machine settings and changes for control of tooth-bearing.

Spiral Bevel Gear Jobbing System

Just within the last year and a half or two years we have developed a new Gleason Spiral Bevel Gear Jobbing System, for the purpose of making it practical to cut spiral bevel gears in small quantities and

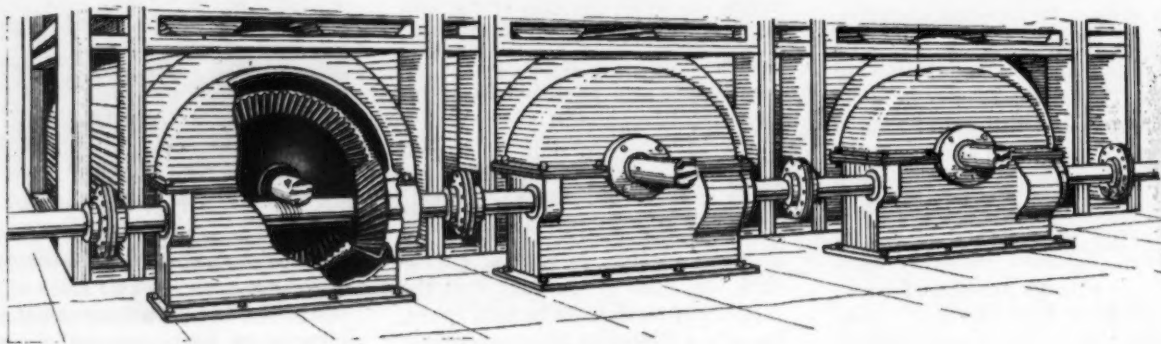


Fig. 6

save as much time as possible in the calculations for the gears and the machine settings. The system-book includes tables, charts, and calculation forms to reduce the desk-work to a minimum. The system required the standardization of certain elements. The machine used is the No. 16 generator, and the tables provided are not applicable directly to any other type of machine. There is a standard list of cutters covering the range of pitch within the capacity of the machine. The pressure angle is 16 deg. The standard spiral angle is 35 deg., corresponding to present average practice. The general tooth proportions are according to the Gleason Spiral Bevel Gear System, which was adopted by the American Gear Manufacturers Association in 1922. The tooth bearings obtained compare very favorably with the best results in large scale production.

This is the system now recommended to any user who has or is intending to install a No. 16 gen-

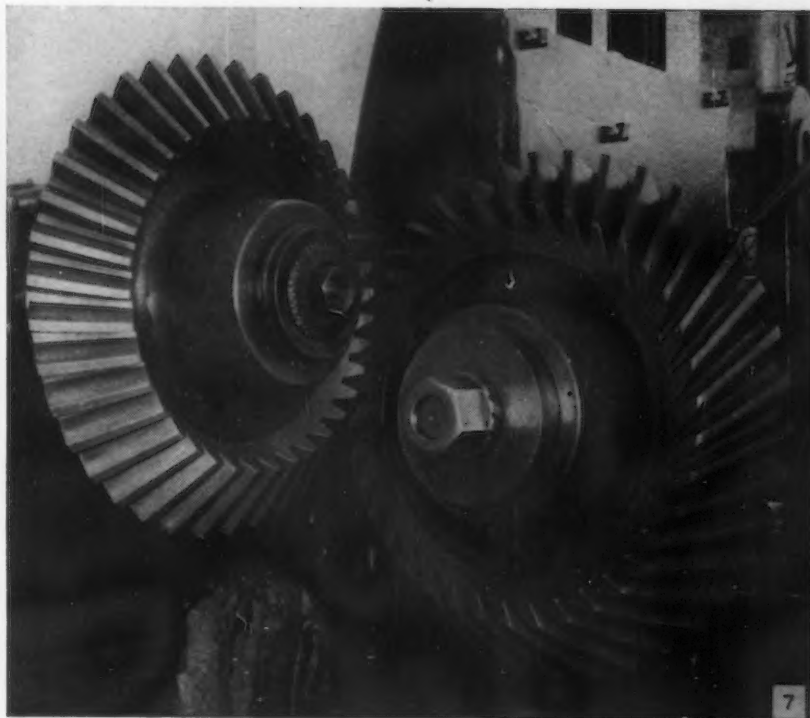
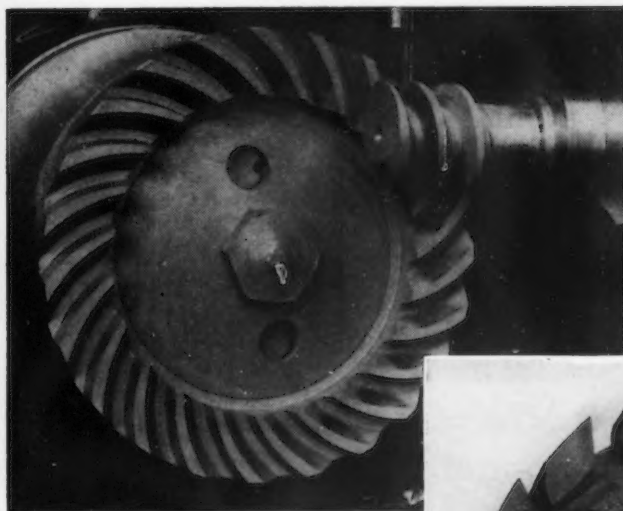


Fig. 7



o o o

AT LEFT

Fig. 8

o o o

a cut has been accomplished satisfactorily for a long time. In the case of the formate gear, however, the cutter contacts for the full depth on both sides of the tooth space; and any experienced shop man knows that a forming cut of this kind is one of the most difficult to make with good accuracy while avoiding chatter.

Fig. 15.—The formate gear has

erator. It represents a considerable advance over methods previously available for cutting spiral bevel gears in small lots.

One of the latest developments in the bevel gear field is what are called formate gears. The name means that the gear is formed without generation, and the pinion is mated to the gear in a correct manner. In the usual generation of a bevel gear, the cutter contacts at only a point on each side of the tooth space, as shown in the diagram (Fig. 14), which means in the actual gear that the cutter contacts along an oblique, curved line on each side of the space. This kind of

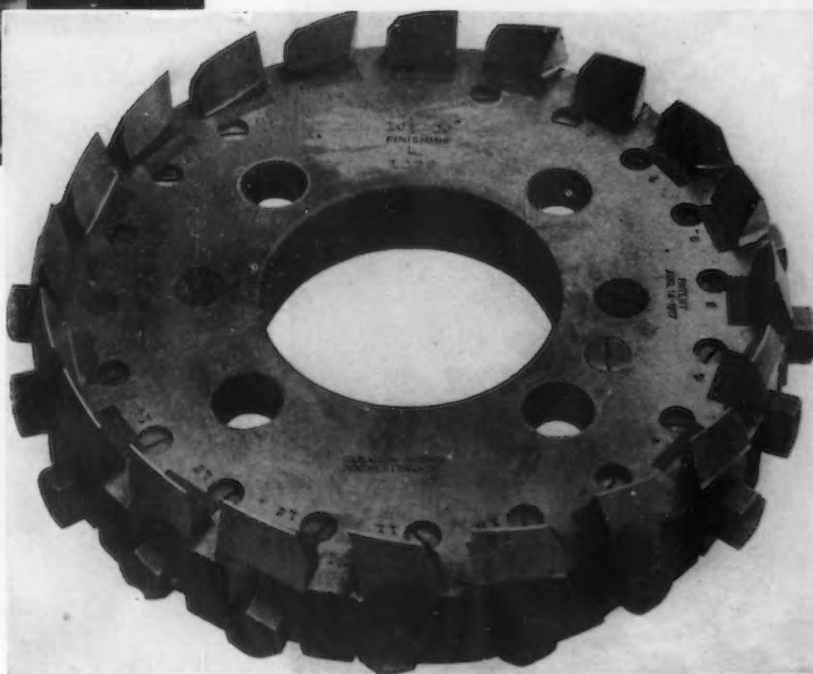


Fig. 9

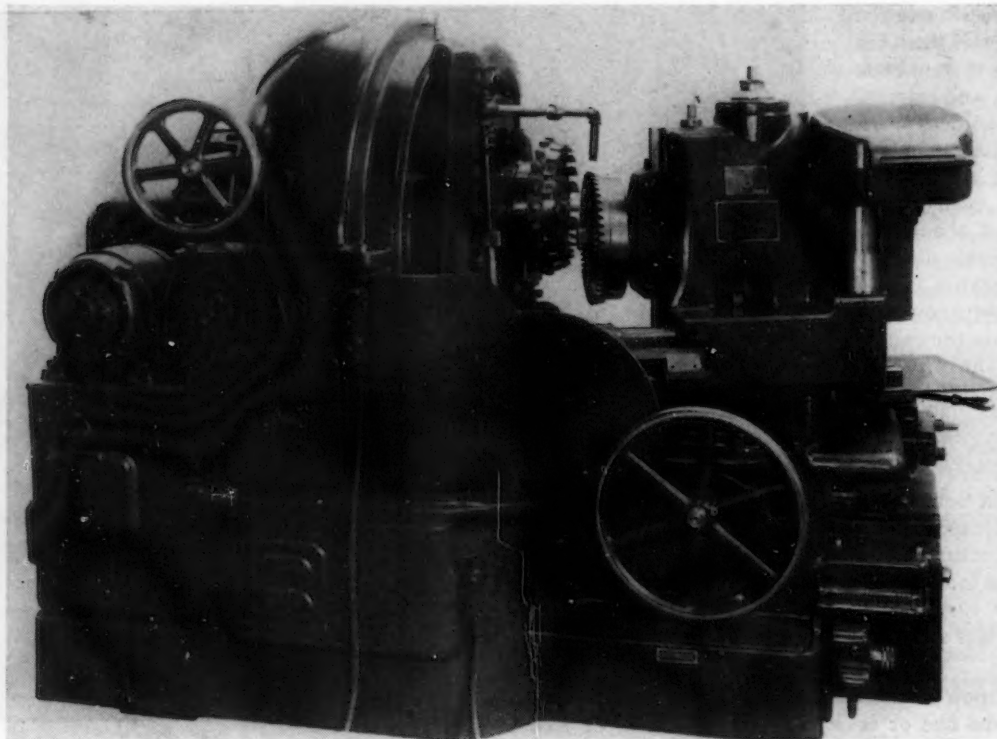


Fig. 10

been made possible by developing a method, a cutter, and a machine. One feature of the method is that the cut is taken a good deal in the manner of a broaching cut. Successive blades in the cutter are set radially beyond the preceding blades, so that each cuts approximately 0.001 in. In addition, the relative position of the cutter and the blank is not disturbed during the operation. There is a gap between the last finishing blade and the first roughing blade, which al-

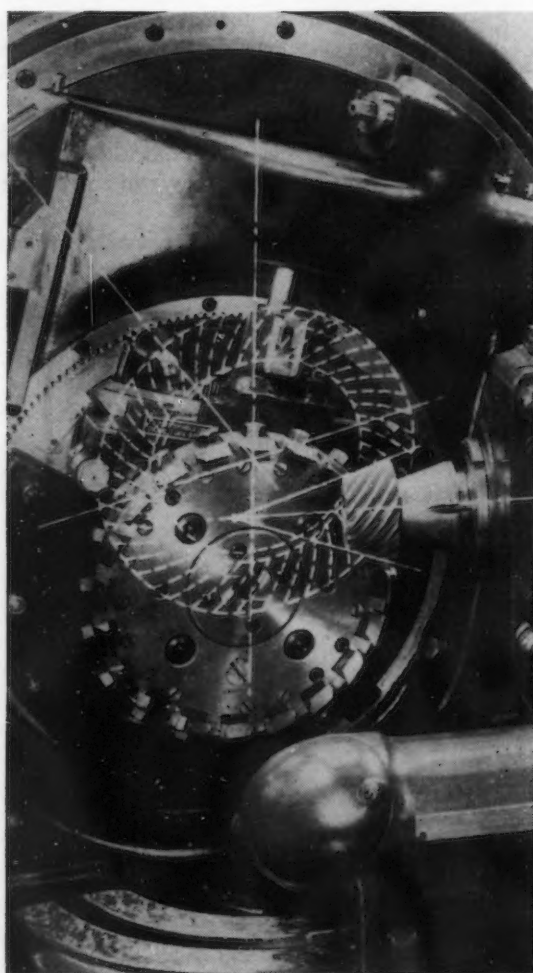


Fig. 12

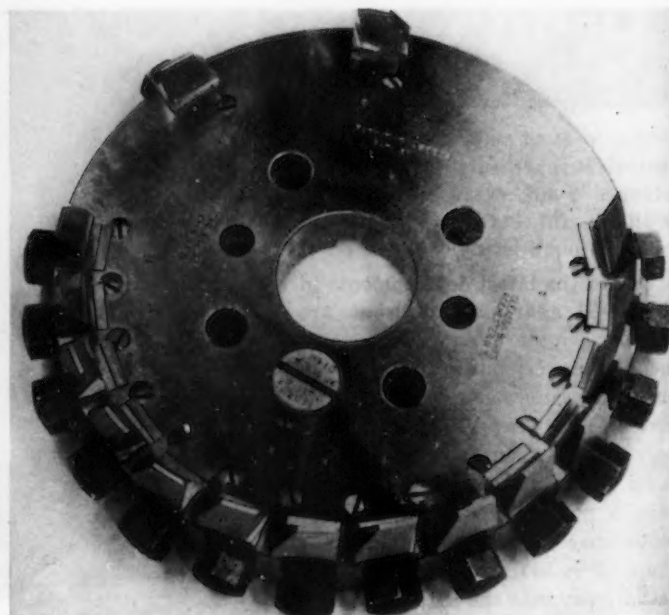
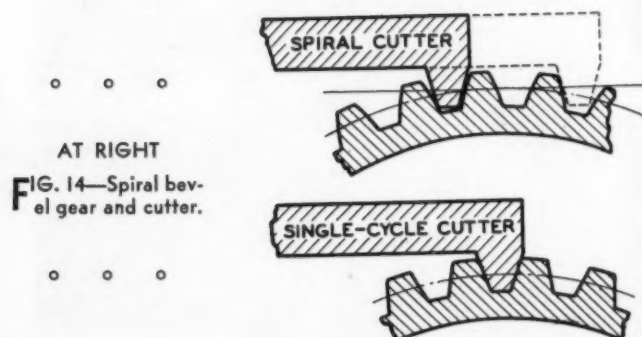


Fig. 15

lows the blank to be indexed at the time the gap is over the face width of the gear. There are also gaps in front of the two finishing blades, so that each is in the cut by itself, and the accuracy is not interfered with by cutting forces on other blades.

New Machine Required

For satisfactory results we also had to design and build a new machine, the No. 11 gear finisher shown in Fig. 16. First, to operate on what is called the single-cycle method, a very quick acting and improved index mechanism was designed, which acts almost without shock. Second, the greatest care and attention possible in design and workmanship were given to the cutter spindle and all other elements of the machine on which accuracy depends.

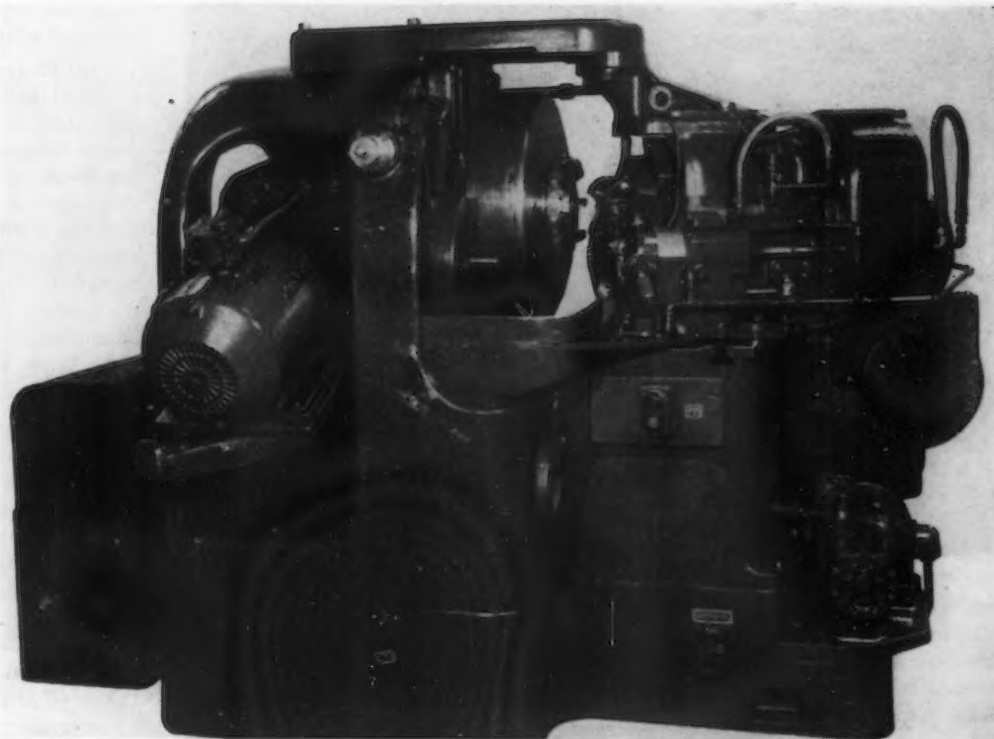
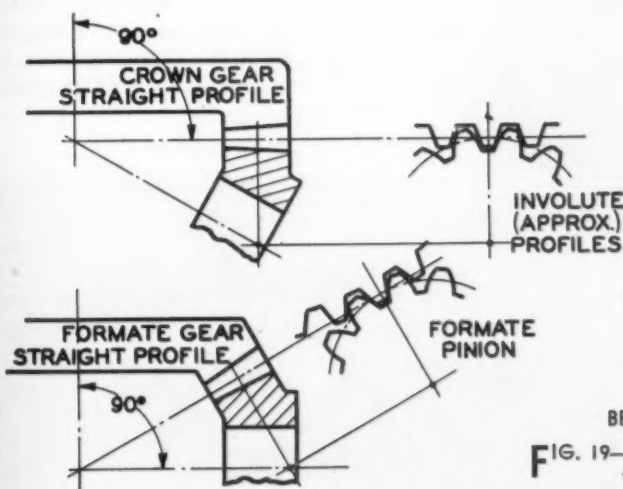


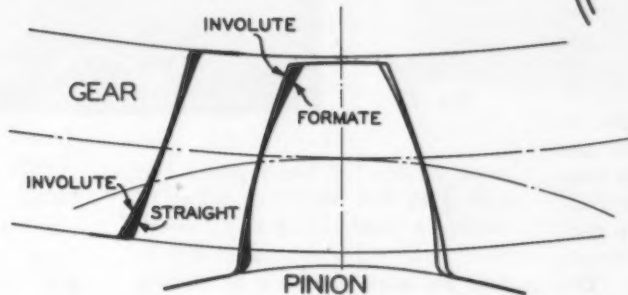
Fig. 16

Some of our customers have naturally asked why they cannot produce the formate gear on their present gear roughers, which also operate without generating motion. If one stops to think about the question, however, it is easy to see that the only reason why a gear rough-

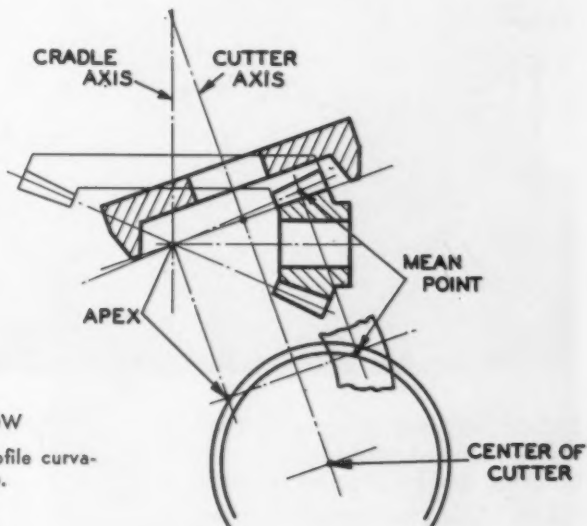
ing machine costs less than a finishing machine is because in the former we leave out some of the special, expensive features and widen our tolerances for fits and workmanship somewhat beyond what is demanded for finishing machines. In our experience, we have found that satis-



ABOVE
FIG. 17—Usual generation is shown in upper view; Formate gears in lower.



BELOW
FIG. 19—Profile curvature.



ABOVE
FIG. 18—Cutter tilted for Formate pinion.

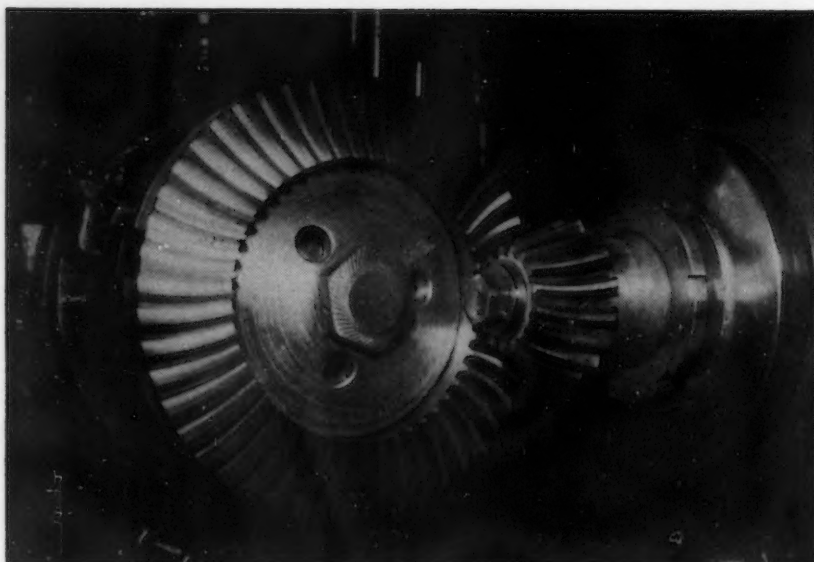
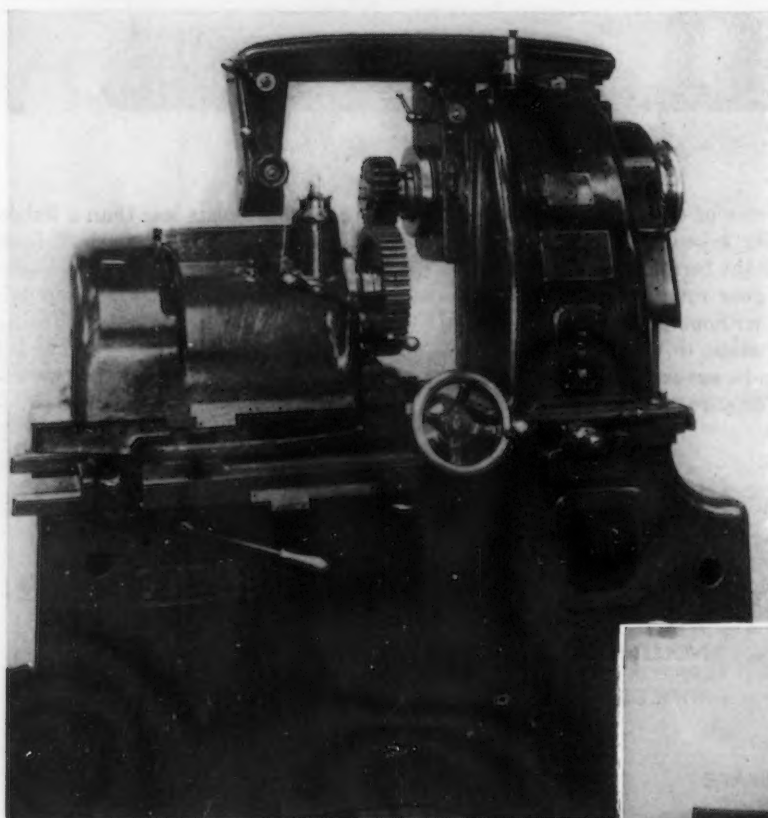


Fig. 20



factory accuracy in gear cutting can be obtained only with the best finishing machine that can be built.

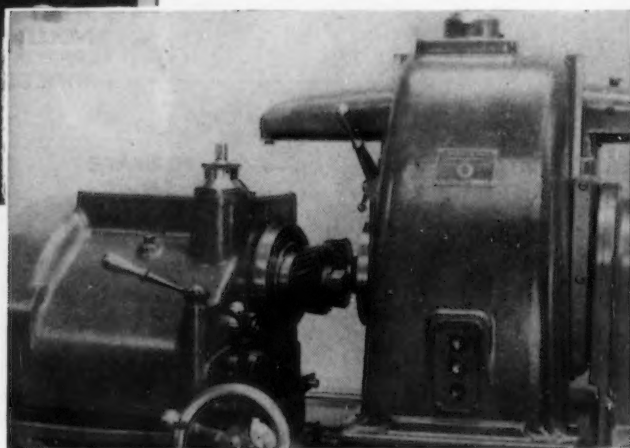
Fig. 17.—After form-cutting the gear with straight tooth sides, the pinion must be generated to match the gear. This is done on the No. 16 generator. The usual bevel gear is generated with its axis set at approximately 90 deg. plus the root angle from the axis of the cradle, so that in effect the teeth are generated from an imaginary crown gear of 90-deg. face angle. The

ABOVE
Fig. 21

o o o

AT RIGHT
Fig. 22

tooth profiles of bevel gears generated in this way are called involute. A pinion to match a formate gear, however, is generated with its axis set approximately at 90 deg.



from the cradle axis, to obtain the required profile shape.

Fig. 18 indicates how in cutting a spiral bevel gear, the points of the cutter blades must be set in the plane tangent to the root-cone of the teeth. For the formate pinion, this requires that the cutter axis be inclined with respect to the cradle axis. Adjustments for tilting the cutter in this way are provided in the modern spiral bevel and hypoid generators.

Fig. 19.—The principal difference between generated gears and formate gears is one of profile curvature. In the usual pair, the gear and pinion both have involute profiles. The formate gear tooth, however, is straight, with metal added at the top and bottom of the profile; so that in the pinion we have to do just the opposite, and remove metal from point and root. The amount of metal put on the gear teeth and taken off the pinion teeth in a pair of average size, say of 10 in. gear diameter and 40 deg. spiral angle, is only from 0.003 to 0.005 in. This is so little that one hardly notices the difference in the general appearance.

Formate gears operate just as satisfactorily as generated gears. The reason for their introduction is the saving of time in cutting the gear without generating motion. The cost of the pinion is not affected. From the way in which the formate gears have been taken up in a comparatively short time, it looks now as if most of the automobile manufacturers will change over in a very few years.

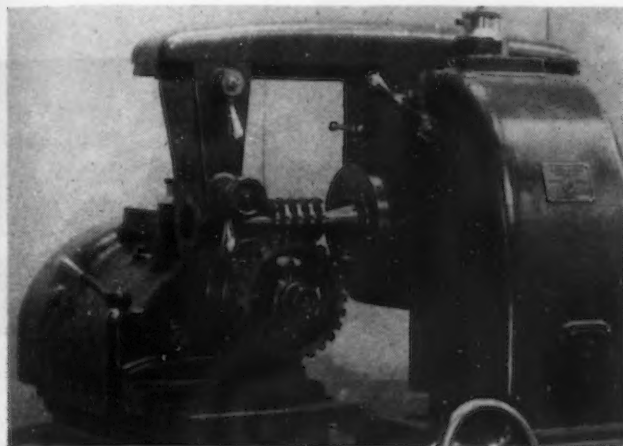
The formate spiral bevel gear is being ground commercially in a number of plants and the results have been very gratifying since the deformation encountered in

heat treating is entirely eliminated. These ground formate gears are being used in both automotive and industrial applications. In addition, we have in our shop two generating grinders for both spiral bevel and hypoid pinions.

long cone distance, such as are used in motor boat drives, and Fig. 23, worm gears.

Gear Tested at Operating Speed

In many shops it is the practice to build a fixture or jig to hold a pair



AT LEFT

Fig. 23

o o o

BELOW

Fig. 26

The very newest thing in bevel gears is a spiral bevel gear with what are called zero spiral angle teeth (Fig. 20). This zero angle spiral angle form of gear has low values of end thrust the same as straight tooth bevel gears and, in addition, the methods of cutting curved teeth make possible the complete control of tooth bearings. These gears, as produced on the larger size spiral bevel planing generators, have been used commercially and more recently the production of zero spiral angle gears on the smaller machines using the circular cutter, have been satisfactorily used.

Gear Testing

Fig. 21.—In a bevel gear shop, or any gear jobbing shop, where various types of gears are encountered, a universal testing machine is almost a necessity. Such a machine makes it possible to set up any kind of gears for a running test. The relative position which gives the quietest running and the best tooth bearing can be accurately determined. There is a pinion head with a horizontal spindle which can be raised and lowered. It can also be moved horizontally at right angles to the spindle. There is a gear head which can be moved axially and in addition is pivoted so as to swing to various positions in a horizontal plane. The photograph shows a pair of spur gears mounted for testing. Fig. 22 shows angular bevel gears with a small shaft angle and

of master gears or sample gears in position so that they can be turned by hand. Over a period of time the cost of the machine will be much less than the cost of a number of these old style fixtures, and in addition it makes it possible to test the gears for quietness and tooth-bearing at operating speeds.

Fig. 26.—In spiral bevel gear practice, from the beginning, tooth-bearings have been used which do not cover the whole length of the teeth. This is required by conditions of manufacture and operation. The photo-

graph shows spiral bevel teeth in which the tooth-bearing has been placed first at the heel and then at the toe position. This is done by making slight vertical and horizontal displacements in the testing machine. In the old days, the gears were tested only with a central tooth-bearing; and there was a question in regard to the character of the tooth surfaces at the ends of the teeth where no contact was shown. With this so-called "V-and-H" check we actually move the tooth-bearing from end to end, and run the gears in both positions. The amount of displacement in the testing machine required to shift the tooth-bearing is a direct method of determining how much mis-match exists between the surfaces and is subject to control in the cutting operation. The gears are cut and lapped so that after the final process, the V-and-H check

meets specified values, which may be 0.010 or 0.012 in. up or down and different amounts in and out.

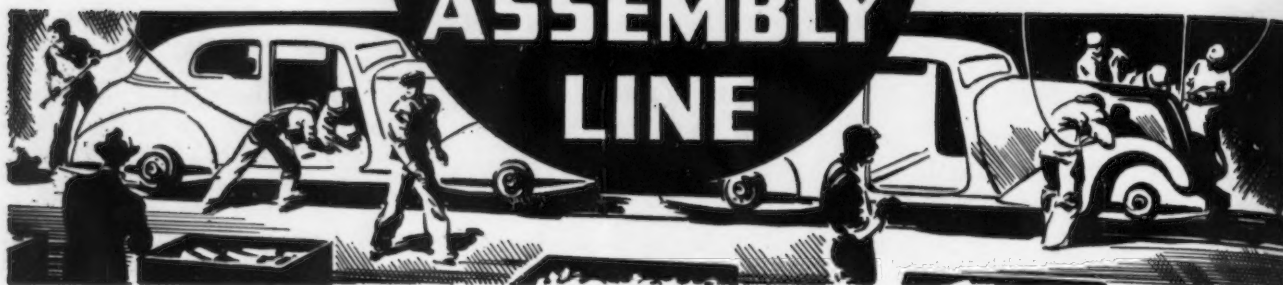
Fig. 27.—This is a photograph of a pair of hypoid gears after final lapping. The smooth central tooth-bearing of regular outline is clearly shown. The excellence of this final result has come about after years of development in the designing of machines and tools, and in the technique



Fig. 27

of gear cutting. The effort still goes on to make the results ever better and to obtain them at less cost.

THIS WEEK ON THE ASSEMBLY LINE



... Ford offers economy 60-hp. engine as optional powerplant in same chassis as standard 85-hp. V-8; sets 1,300,000 cars and trucks for 1937 sales objective.

o o o

... Chevrolet offers distinctive styling in a car that has been completely redesigned from bumper to bumper; sets 1,200,000 cars and trucks as 1937 domestic sales goal.

o o o

... October sales of Buick, Packard and Studebaker are away ahead of expectations, and schedules are being increased for next few months.

drives through a rear axle having a ratio of 3.78 to 1 in place of last year's 4.11, whereas the economy engine drives through an axle having a ratio of 4.45 to 1. Furthermore, the tires are somewhat smaller and transmission ratios in both second and low are higher. As a result, the smaller engine turns over at a 23 per cent higher speed than the large engine for identical road speeds. Top speed of the little engine is 70 mi. an hour, but the comparable performance is reduced by 30 per cent. An additional factor has been the reduction in weight of the chassis through the use of lighter gage fenders and other stampings. Obviously, the play is made on economy in this 60-hp. engine, and although no of-

o o o

DETROIT, Nov. 10.—Ford's announcement of an optional 60-hp. V-8 engine in place of the standard 85-hp. engine in both the standard passenger car and the truck chassis was the highlight of this week's car announcements. As has been mentioned from time to time in these columns, the small engine is placed in the same chassis as the large one and is the same type of motor that has been manufactured in England and on the Continent in the last year. On deluxe models only the large engine is furnished. The accompanying table gives comparable data on the two engines. As can be seen, the specific output of the small engine has been increased by stepping up the compression ratio from 6.12 to 6.75 to 1, and a relative increase in horsepower much larger than the

cubic inch displacement would indicate is obtained by running the motor at higher speed.

The 85-hp. engine, for example,

A DISTINCTIVE new styling note is found in the so-called "Diamond crown speed line styling" of the 1937 Chevrolet, which is new from bumper to bumper.





ficial figures have yet been released, it has been reported that on a trial run, economies up to 22-25 miles per gal. have been attained.

As has also been intimated, the new Ford body closely resembles the Lincoln-Zephyr. The radiator grilles are horizontal and are pulled back at the top. Hood louvers resemble the Zephyr, but are about twice as long. The hood is hinged in the rear, following the popular trend this year, and the head lamps are faired into the fender aprons. On the Zephyr, however, the head lamps are faired into the fender crowns. A steel top is incorporated and the rear window is

o o o

Front line styling of the new Ford follows very closely that of the Lincoln-Zephyr from radiator grille to V-shaped windshield and steel top. A small or a large engine are optional equipment in the standard chassis.

split in line with Zephyr practice.

Ford's new brakes are a modification of the Model "A" brake, which Henry Ford himself admitted last week was the best brake they could find, and hence they returned to it. It has cable controls, operating through flexible conduit tubes between the chassis frame and the backing plate to which the brake shoes are attached. Elimination of wear and rattle in brake rod connections has thereby been effected. Steering has been made easier, and the spring rates have been changed so as to produce a softer ride and at the same time prevent possible upset when rounding a curve at high speed. Another innovation this year is location of the battery under the hood in a recess in the dash. Incidentally, alloy steel pistons are standard equipment this year on both the small and the large engines.

The New Chevrolet

As has been also anticipated, the 1937 Chevrolet has been completely

redesigned from bumper to bumper. In fact, both the front and rear bumpers are of deeper section than on last year's car. The body is entirely new and represents not only a distinctive styling note for 1937, but for the first time a complete divorcement of the Chevrolet from the Fisher Body family of curves. For manufacturing economy in other years many stampings have been identical on Chevrolet and other G.M. cars. This year Chevrolet obviously has its own body, but the body shell for the Pontiac, Oldsmobile, Buick 40 and LaSalle are said to be identical. Chevrolet's distinctive treatment is what they call "diamond crown speed line styling." The side flaps of the hood are shorter than heretofore and the ledge on which they rest between the front fender and hood side is carried back as a sloping offset gradually diminishing toward the rear until it blends into the door panel. This treatment requires an appreciable bulge in the forward end of the door panel, with a very sharp corner at a point where the door is flanged in, probably making one of the most difficult drawing operations to be found on any car this year.

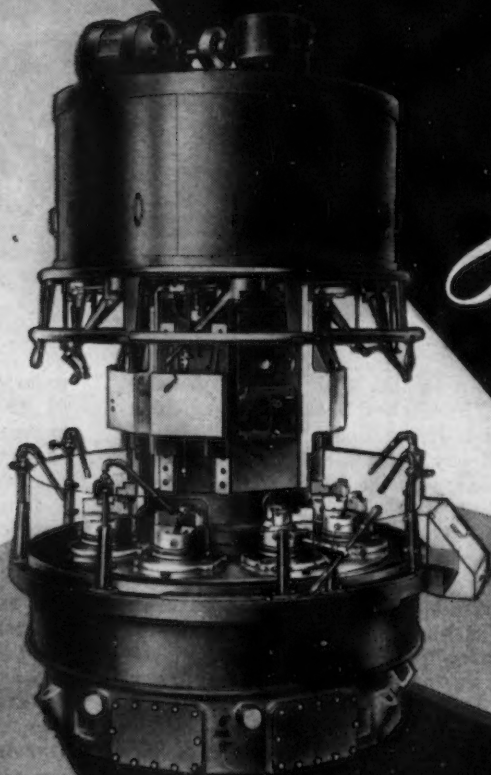
The bodies are wider by 5 in. at the floor level, which is $2\frac{1}{16}$ in. lower than last year's car. Like other General Motors units this body features the new Fisher Uni-steel construction, where the outer panels, instead of being merely hung on the body framework, now become a major structural factor. The floor pan or underbody consists of two ribbed pieces which are welded to U-shaped cross bars to provide reinforcement at vital points. Heavy steel rocker panels



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welded to the sides of the floor pan replace the former sills. There are also U-shaped steel channels which replace the wood bows for supporting the solid steel top. The doors are also made entirely of steel and "tinniness" is removed by heavy insulation and the use of dual construction consisting of the inner steel framework welded to the outer steel panel.

Although Chevrolet still retains the valve-in-head engine, it has been completely redesigned. Bore and stroke is now 3 1/2 x 3 3/4 in., as compared with 3 5/16 x 4 in. last year, and the displacement has been stepped up from 206.8 to 216.5 cu. in. Compression ratio has been raised from 6.0 to 6.25 to 1. Cast iron pistons are still employed, but they are of a high strength variety, much lighter in weight, with a dome head and a cut-away slipper type skirt. Rated horsepower has been increased from 79 to 85, directly comparable with the large Ford V-8 engine.

Like the entire Chrysler line and several other General Motors units, Chevrolet has adopted the hypoid rear axle and has thereby been enabled to drop the propeller shaft 1 1/2 in. Like the Buick, the pinion shaft is mounted on a full-type roller bearing with the rollers running directly on the pinion shaft. A double direction angular contact ball bearing carries the thrust and propeller shaft load. Rear springs have been shortened to 49 in. to effect better timing with relation to the knee action units, which are now offered as standard equipment on the Master DeLuxe series. The Master (last year's Standard) series retains conventional semi-elliptic springs at the front end. Both series are on the same wheelbase and have identical appearance.

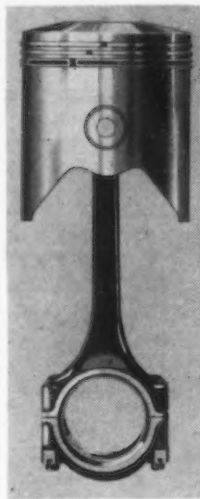
Frames have been greatly simplified in construction and have been made lighter yet stiffer through the use of box girder side rails and two box section cross members riveted together. All complicated reinforcing pieces have been eliminated. Like many other 1937 cars, Chevrolet also has steel spoke disc wheels with massive hubs.

Aside from the difference in front wheel support, the Master series has a rear axle with a ratio of 3.73 to 1 compared with 4.22 to 1 on the Master DeLuxe model. This gives the effect of a modified over-drive in third speed, but reduces acceleration. Steering gears also vary, the former using a worm and straddle mounted sector gear with a 16 to 1 ratio, whereas the DeLuxe model has a roll and worm sector type of 17 to 1 ratio. Both

feature new mechanisms for absorbing road shock.

A Keen Race Expected

It is evident from the above descriptions that the race between



A LIGHT-WEIGHT cast iron piston with dome head and cut-away slipper type skirt is featured in Chevrolet's new valve-in-head engine.

Ford and Chevrolet will be keener this year than ever. It is further evident that the race may be won or lost in the new economy 60-hp. Ford, which has been primarily designed to reach the rural market and fleet operators of business coupes and light delivery trucks. It is anybody's guess at this moment as to what proportion of total output will go into the little job, although it is understood that for initial runs the budgeted production represents one-quarter of the total. Ford has set as a goal domestic sales of 1,300,000 cars and trucks for the 1937 season. Chevrolet, less optimistic, has set 1,200,000, about 100,000 over last year's sales.

On the other hand Chevrolet is off to a much faster start. Production is now up to 5000 units daily and will shortly go up to 6000. Approximately 75,000 cars had been shipped to dealers by an-

nouncement date on Nov. 7. Ford barely got into production two weeks ago, and last week is estimated to have assembled about 6700 cars. Ford is doing much more this year than ever before, however, to build up dealer enthusiasm.

Last week Ford assembled the largest single group of dealers ever brought into this town to witness the Ford preview at the Coliseum and to present Henry Ford with a 300-year-old Cape Cod windmill for his Greenfield Village. Here over 8000 dealers crowded into the amphitheater to see a gorgeous spectacle of pageantry as detailed design changes of the new car were presented. This mob of dealers overflowed all hotels and 2500 of them were housed in Pullmans in the railroad yards. This is the first time in its history that the Ford Motor Co. has ever put on a united dealer meeting of this kind. The only thing missing was an old Model "T," which would have shown how far the company has gone in modernizing both its product and its merchandising setup in the last ten years. Both are decidedly streamlined.

Big 1937 Market Foreseen

Sales of cars by some of the earlier announcers point to the greatest boom market for cars since 1929. Packard reports shipment of over 11,000 cars in October and retail sales of 9900, almost double the number in October a year ago. The company has unfilled orders on hand for 16,000 cars. Buick has shipped 19,525 cars in October, reports unfilled orders of 30,000 cars, and has set up its November output to 25,300 and its December figure to 27,326, including export shipments. Current assemblies are running close to 1300 a day at the main plant at Flint and the new assembly plant at Los Angeles. Last year Buick averaged around 800

Comparison of Ford Engines			
	85 Hp.	60 Hp.	
Bore and Stroke, in.	3 1/16 x 3 3/4	2.60 x 3.20	
Displacement, cu. in.	221	135.9	
Taxable Hp.	30	21.63	
Torque, ft.-lb.	149 at 2,000 r.p.m.	94 at 2,500 r.p.m.	
Comp. Ratio	6.12 to 1	6.75 to 1	
Comp. Pressure, lb./sq. in.	135 at 2,500 r.p.m.	150 at 2,800 r.p.m.	
Weight with Trans. & Clutch, lb.	562	400	
Trans. Ratio			
2nd	1.60 to 1	1.77 to 1	
Low	2.82 to 1	3.07 to 1	
Rear Axle Ratio	3.78 (1936 4.11)	4.45 to 1	
Tires in.	6.00 x 16	5.50 x 16	
Outside Diam., in.	28	27	
Engine r.p.m. at 60 m.p.h.	2,720	3,340	

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Bold Face Type Indicates Changes This Week.

	October, 1936	September, 1936	October, 1935	Ten Months, 1935	Ten Months, 1936
Raw Materials:					
Lake ore consumption (gross tons) ^a.....	.....	4,026,690	2,910,863	24,735,249	.....
Coke production (net tons) ^b.....	.....	3,994,741	3,141,851	28,503,247	.....
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	2,992,968	2,730,293	1,978,411	16,835,436	24,557,476
Pig iron output—daily (gross tons) ^c	96,547	91,010	63,820	55,379	80,516
Castings:					
Malleable castings—Production (net tons) ^d..	.....	46,552	43,467	376,520	.....
Malleable castings—orders (net tons) ^d.....	.....	44,361	45,246	362,260	.....
Steel castings—production (net tons) ^d.....	.....	76,617	42,597	325,030	.....
Steel castings—orders (net tons) ^d.....	.....	56,877	34,553	326,914	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	4,545,001	4,161,108	3,142,759	27,194,171	38,150,305
Steel ingot production—daily (gross tons) ^e ..	168,333	160,043	116,398	104,593	146,170
Steel ingot production—per cent of capacity ^e *	76.70	72.92	52.58	47.25	66.60
Finished Steel:					
Trackwork shipments (net tons) ^e.....	.....	5,722	3,495	36,114	.....
Steel rail orders (gross tons) ^e	119,237	25,800	38,742	363,299	804,065
Sheet steel sales (net tons) ^e.....	.....	255,557	226,209	1,981,070	.....
Sheet steel production (net tons) ^e.....	.....	213,706	222,963	1,991,675	.....
Fabricated shape orders (net tons) ^e.....	.....	112,594	102,708	880,675	.....
Fabricated shape shipments (net tons) ^e.....	.....	137,008	98,444	924,256	.....
Fabricated plate orders (net tons) ^d.....	.....	34,302	30,530	203,615	.....
Reinforcing bar awards (net tons) ^e	22,135	18,755	31,865	277,840	297,500
U. S. Steel Corp. shipments (tons) ^b	1,007,417	961,803	686,741	6,027,964	8,875,124
Ohio River steel shipments (net tons) ¹.....	.....	95,705	104,659	776,170	.....
Fabricated Products:					
Automobile production, U. S. and Canada ^b...	.....	135,130	283,337	3,349,377	.....
Construction contracts, 37 Eastern States ¹	\$225,839,900	\$234,271,500*	\$200,595,700	\$1,392,293,400*	\$2,267,468,100
Steel barrel shipments (number) ^d.....	.....	787,380	884,888	5,696,681	.....
Steel furniture shipments (dollars) ^d.....	.....	\$1,549,808	\$1,562,303	\$12,374,298	.....
Steel boiler orders (sq. ft.) ^d.....	.....	1,055,502	784,341	5,095,992	.....
Locomotive orders (number) ^m	22	24	0	28	180
Freight car orders (number) ^m	1,310	3,100	810	8,103	38,658
Machine tool index ⁿ.....	.....	118.5	102.9	102.9	.....
Foundry equipment index ⁿ.....	.....	161.0	140.0	127.1	.....
Foreign Trade:					
Total iron and steel imports (gross tons) ^p...	.....	59,993	59,569	358,824	.....
Imports of pig iron (gross tons) ^p.....	.....	15,080	17,168	99,098	.....
Imports of all rolled steel (gross tons) ^p.....	.....	28,618	24,444	176,762	.....
Total iron and steel exports (gross tons) ^p...	.....	235,577	238,358	2,622,825	.....
Exports of all rolled steel (gross tons) ^p.....	.....	74,489	81,248	724,151	.....
Exports of finished steel (gross tons) ^p.....	.....	66,068	63,954	620,507	.....
Exports of scrap (gross tons) ^p.....	.....	152,290	145,850	1,797,468	.....
British Production:					
British pig iron production (gross tons) ^r.....	.....	650,800	544,300	5,337,600	.....
British steel ingot production (gross tons) ^r....	.....	1,027,000	907,300	8,127,600	.....
Non-Ferrous Metals:					
Lead production (net tons) ^s.....	.....	32,982	42,618	339,375	.....
Lead shipments (net tons) ^s.....	.....	50,685	42,271	348,088	.....
Zinc production (net tons) ^t	46,297	42,283	36,716	353,480	431,479
Zinc shipments (net tons) ^t	54,035	51,847	47,033	375,486	446,345
Deliveries of tin (gross tons) ^v	6,005	6,200	5,355	49,715	61,730

†Three months' average. *Revised.

Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange.



Weekly Index of Rate Activity in Capital Goods, Adjusted for Seasonal Variation, 1925-27 Average = 100

THE IRON AGE Weekly Index Numbers of Capital Goods Activity (1925-'27 Average = 100)

Last week	86.6	Same week 1933	41.9
Preceding week	84.2	Same week 1932	34.1
Same week last month	81.6	Same week 1931	49.2
Same week 1935	69.7	Same week 1930	70.9
Same week 1934	42.0	Same week 1929	112.9

FURTHER improvement in the heavy industrial situation has been reflected by another rise in THE IRON AGE's index of capital goods activity. For the week ended Nov. 7, the index advanced 2.4 points to 86.6 per cent of the 1925-27 average. While under the peak for the year, this figure, incidentally, is the same as was indicated for the second week in August, which on a monthly basis turned in the best performance of any previous or subsequent month this year, according to the usual evidence supplied by the index.

The upward movement last week of the combined activity level is attributable to post-seasonal strength in steel-making, a greater than normal rise in automobile production, to a contra-seasonal increase in

shipments of lumber and sustained activity in the key industrial area of Pittsburgh. The only series to show a decline for the week was the engineering construction factor, and this, at least, was partly due to interference from the election day observance. Compared with the corresponding 1935 week, the present level of the combined index is about 24 per cent greater.

During October, as computed from the weekly figures, the index averaged 82.0 per cent of "normal." This contrasts with a revised value of 81.5 for September; 86.5 for August, the peak month; and 84.0 for July. All previous months this year were beneath the 80 per cent level.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

Automobile Output Gaining in Russia

SOVIET Russia's automobile and truck production capacity is to be doubled during the coming year or two, according to Stanley Shaw of Michigan Tool Co., who has just returned to the United States after six months in Europe.

This increase will provide a daily

production capacity of 500 passenger cars and 1000 1½-ton trucks at the Gorky plant. According to Mr. Shaw the Gorky plant at present employs some 23,000 men and women and is remarkably efficient in its operation. In this respect he says the plant compares favorably with many plants in the United States. A great deal of this is attributed to the outside viewpoints available in the man-

agement and organization of the plant and the extensive educational program for the men in the shop. Mr. Shaw estimates that approximately 15,000 of the present employees are being schooled as specialists in tool design and manufacture, die making, metallurgy, drafting, and factory management, etc. Instruction is carried on at the expense of the government and wages are paid during school hours.

WASHINGTON



By L. W. MOFFETT

Resident Washington Editor,
The Iron Age

... *Legislative program of reelected New Deal probably will include a coal act and other laws favored by labor.*

o o o

... *President Roosevelt is expected, however, to proceed more carefully in framing new legislation.*

o o o

... *Business told by Secretary Roper that it has nothing to fear from Government; a more conciliatory spirit toward business looked for.*

WASHINGTON, Nov. 10. —In a message yesterday at the opening of the third National Labor Conference in Washington, President Roosevelt said he expected "This coming year should be an outstanding one in the annals of labor legislation." Desired reforms which he listed include safe and healthful places of work, adequate care and support of workers when incapacitated by reason of accidents, industrial disease, unemployment or old age, reasonably short working hours, adequate annual income, proper housing and elimination of child labor.

The conference which probably will last over tomorrow is being attended by official representatives of governors of most of the States and representatives of labor and the general public. The President's message said the country last week gave a mandate in unmistakable terms to its legislators and executives to proceed along the lines he enumerated.

o o o

WASHINGTON, Nov. 10.—Reelected by an unprecedented and astounding electoral and popular vote, President Franklin Delano Roosevelt has accepted his remarkable triumph with justified jubilation yet with commendable restraint. To make his achievement complete, the country has returned to Congress an

unwieldy and increased majority in both branches, elected on the New Deal ticket. Unquestionably the Congressional sweep was due largely to the popularity of the President. His cup of victory indeed was filled to the overflowing. So at the outset at least of his second term his control of the executive and legislative branches of the Government will be even greater than it was during his first term, if that is possible. Most certainly no other President had more nearly complete control of Congress than did Mr. Roosevelt during his first term. And with reelection to a second term his greatest political aspirations, it is to be assumed, have been achieved, thus giving to him an even freer hand in executing his legislative program at the next session of Congress, which begins Jan. 5.

It is conceivable, in view of the conflicting groups which supported the New Deal, that sooner or later the President will face factional disputes. But it is doubted that, with such present strong popular opinion back of him, opposition to his program could possibly prevail, even if it developed, during the forthcoming session of Congress. Clearly therefore the New Deal can enact any legislative program it may determine upon, just as it did during its first term. As in the first term, however, any program, if it exceeded the constitutional limits, would face the acid test of the Supreme Court, which has devastated major measures of the New Deal, such as NRA, and AAA. But even this situation may be changed. In view of the advanced ages of a number of justices

of the Supreme Court it seems probable that the President will be called upon to appoint their successors during his second term, resulting in a Supreme Court personnel that would be more favorable than the present majority of the court to New Deal legislation. This is a general rather than a specific observation, for the most crushing New Deal defeat suffered at the hands of the Supreme Court was the court's unanimous decision which invalidated the NRA. The court's oldest member from a point of age is Mr. Justice Brandeis, a so-called liberal.

More Care in Legislation

In any case, whatever its program may be, it is believed that in its second term the administration will proceed more carefully than heretofore in framing legislation in order that it may, if attacked, run the constitutional gamut. The President has not disclosed what his program will be. In his final campaign speech at Madison Square Garden in New York, he served notice that he had just begun to fight, thus indicating that he will proceed vigorously with a program in accord with his ideas of "planned economy," though this has not been taken to mean necessarily that he will go to the extent he did with regard to former measures, even if some of his advisers are in favor of such procedure. The only definite statement as to a program made by the President since his reelection, was made at his home in Hyde Park last Thursday when he said he was going to Washington "to try to balance the budget, thereby carrying out the first cam-

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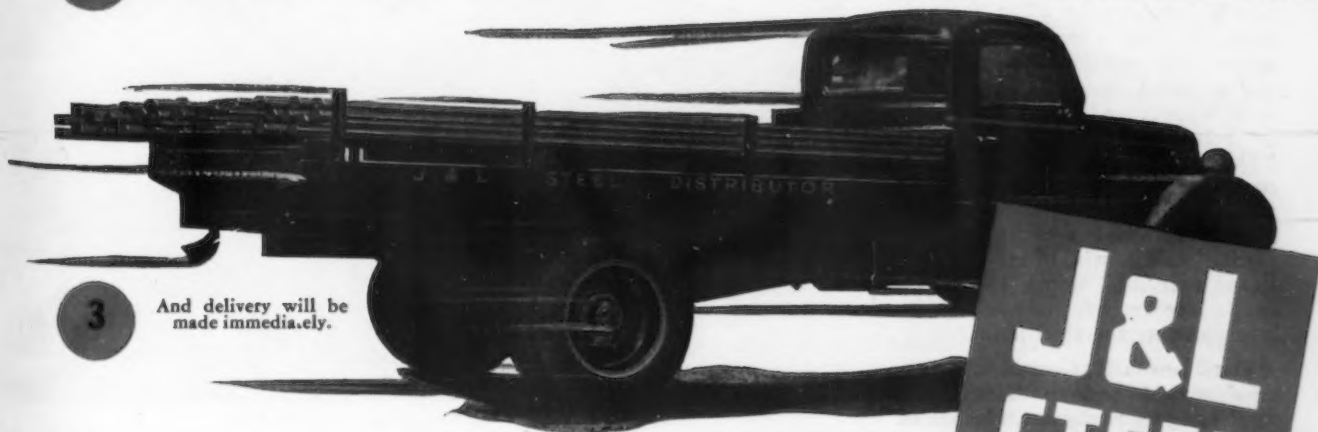
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paign pledge" of the New Deal. He is now engaged in studying the budget. Business has been told by Secretary of Commerce Roper that it will have nothing to fear from the government, and he urged co-operation between the two and said he expected it to come about to a greater extent than it has in the past.

The President will be officially reelected on Jan. 6, when a joint session of Congress meets and opens the electoral votes. His second term will begin on Jan. 20, when he again will be inaugurated. There will be some changes in his cabinet. Their extent and character are matters of speculation only. Also it is not known what changes, if any, he may make among heads of present New Deal agencies.

New Coal Bill Promised

The President proposes to revive coal legislation. He so stated recently. It will be designed to replace the Guffey Coal Act, which the Supreme Court held to be unconstitutional. The means of hurdling the constitutional obstacles on this and other legislation expected to be asked for is not known.

This is part of the program of organized labor which so strongly supported the President for reelection. It is believed that support pledged to the President by John L. Lewis and the United Mine Workers Union which he heads was contingent on the President's promise to ask for another Guffey Act in some form. The UMW pledge to the President last February at its Washington meeting as a matter of fact, Lewis insists, "blazed the trail" followed by unorganized and organized labor to which he takes credit for President Roosevelt's election. Lewis was quick to make known this sentiment once the President was reelected. He expressed it in a message to the UMW immediately after the election. It was a means of serving notice that organized labor is going to insist upon the administration supporting the cause of labor in return for services rendered. "The workers of the country must organize themselves to consolidate their political victory and translate it into material benefits and reforms," said Lewis, in his message. Lewis evidently thinks the President's election will aid the former in organizing the steel industry.

Simultaneously, George L. Berry, president of Labor's "Non-Partisan" League, really an offshoot of Lewis' Committee for Industrial Organization, issued a statement saying that the election would be recorded in history as "labor's victory," declaring that "the almost

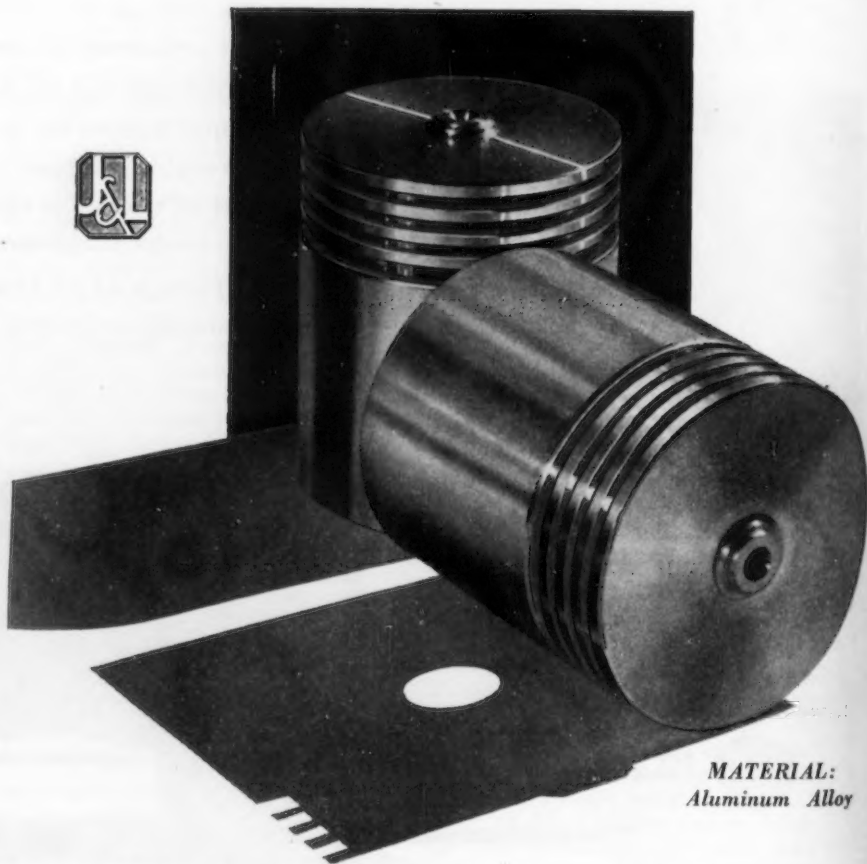
100 per cent support of organized labor and its sympathizers behind President Roosevelt" served "to stimulate the rank and file of all workers, organized and unorganized."

Labor Laws in Forefront

It is unquestionable that labor will be one of the most important issues in the second term of the President. It is certainly the conviction that the President will respond largely to the demands of organized labor. The coal legislation in mind is believed to be only a small part of a labor program as a matter of assuring minimum wages, maximum hours and the right of collective bargaining. In other words, another NRA on a modified and reduced scale, it is believed, is to be

projected. As has been stated, the means of getting around constitutional obstacles are not clear. Some sources in the administration have suggested so-called State compacts. But they are not thought to reflect the administration plan, which is said to contemplate centralized Federal control. Rather it is the belief that there is strong prospect of quick action on separate Federal laws for particular industries, one for coal, one for textiles, etc., but not necessarily for all basic industries, such as steel. There are reports that it may be proposed to set up authorities for agreements on wages, hours and collective bargaining, perhaps to be administered by the Federal Trade Commission or some other Government agency. Consolidation and relaxation of

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anti-trust laws, probably along the lines on which Donald Richberg has said he is working, appear also to be in mind, an undertaking that probably would take considerable time to effectuate.

Higher wages, with a view of wider distribution of the national income—distribution of the wealth—constitute one of the fundamental ideas of the President, as his legislation of the past has indicated, and that he will urge legislative enactment of the policy seems to be probable. And, of course, he is strongly back of organized labor in demands for the right of collective bargaining, another right that, no doubt, would be insisted upon if the Wagner-Connelly Labor Disputes Act, which

guarantees that right, were held to be unconstitutional. Should the Supreme Court so hold, some way of restoring the principle of such legislation evidently would be sought. Voluntary wage increases being announced by the steel and other industries undoubtedly are pleasing to the administration, but it has been stated that they will not prevent organized labor from demanding recognition.

May Lend to Railroads

In other fields of prospective legislation it is believed that the life of the Reconstruction Finance Corp. will be extended in January and the Government again authorized to lend to the railroads and also to participate in the financial setup of reorganized railroads.

In the field of housing there are reports that legislation may be enacted providing for public construction on a relatively small scale and that provision will be made for grants and loans. There are also reports that the Federal Housing Act will be revised providing for continuance of insurance of mortgages and a Federal scheme under a National Mortgage Association. Possibility of a smaller Public Works program than heretofore is also reported.

In the field of taxation the Joint Congressional Committee on Internal Revenue Legislation will make recommendations designed to eliminate inequities and administrative difficulties in the present tax structure. It has also been indicated that there may be revision of provisions of the 1936 undistributed profits tax, which was subjected to vigorous opposition by industry when it was under consideration.

The Reciprocal Tariff Act, which expires June 12 under the present law, undoubtedly will be extended, as will numerous new emergency agencies, though the latter may be pared down somewhat and reorganized. The administration is said to have given orders for sharp curtailment in expenditures on regular establishments of the Government as one means of balancing the budget. The belief prevails, however, that the country as a whole will be disappointed that early reduction in Government expenditures will not be nearly so great as is generally hoped.

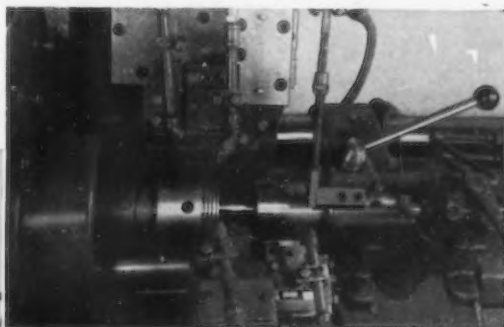
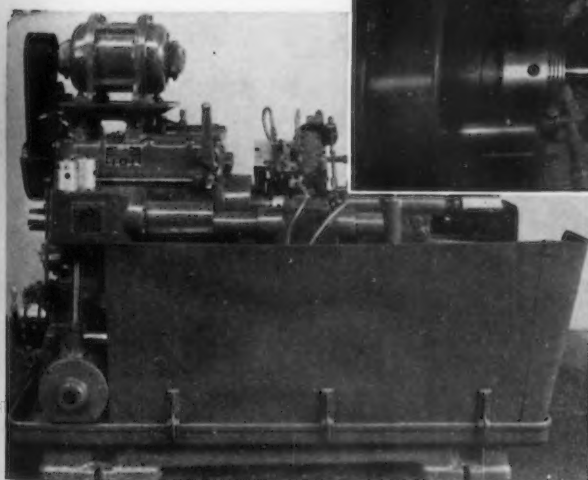
President May Seek Cooperation of Business

Efforts to analyze the President's course in the next four years would be futile at this incipient stage. There can be no assured answer as to whether he will turn to the left or the right, and the term itself may be only relative, depending on the viewpoint. The President himself has said that "The term right and left is a sophomoric term, and high school school sophomoric, at that." But it is probably safe to say that, whatever may be done ultimately, the administration has a middle course in mind. Manifestly the President wants all the cooperation he can get from the various sections of the national life. Obviously for the national welfare that is essential. In this connection one of its essential features is that of better cooperation between the Government and business in order that the latter may go further in absorbing the unemployed. Unemployment, of course, is one of the biggest problems before the administration.

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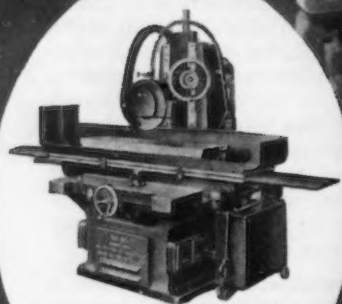
In a machine cycle of 28 seconds 9 surfaces are machined. 23 tools are mounted in 3 tool carrying members. There are 7 distinct tool movements as follows:

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| 4 Chamfer all ring grooves. | |
| 5 Finish cam-turn. | |



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Reports coming to Washington would indicate that while large sections of business are not recon-

ciled to New Deal policies they have become reconciled to its reelection, prepared to go along with

it within any reasonable limits. Likewise it is said that under such a circumstance the administration will display a conciliatory spirit to business in its second term to a greater degree than business feels was shown to it during the first term of the New Deal.

Obviously, such a mutual sentiment is highly desirable.

Business Machines Show Pronounced Upward Trend

BOTH employment and production in the manufacture of "business machines" in the United States in 1935 showed pronounced increases as compared with 1933, according to preliminary figures compiled from the returns of the biennial census of manufactures taken this year, released by Director William L. Austin of the Bureau of the Census, Department of Commerce. The number of wage earners employed in 1935 in the manufacture of business machines, 33,866, shows an increase of 53.7 per cent over 1933, and the wages paid these workers, \$40,028,302, exceeded the corresponding total for 1933 by 78 per cent. For value of products a still greater rate of increase was recorded—91.1 per cent, from \$67,295,223 to \$128,596,984. The most striking gain shown for any one class of products covered by this report is that for calculating machines, the production of which increased from 9269, valued at \$2,143,004, in 1933 to 33,726 valued at \$9,092,686, in 1935, the rates of increase in number and value being, respectively, 263.9 per cent and 324.3 per cent. The term "business machines" is applied to a group of machines of which the most important are typewriters, adding and calculating machines, cash registers, and card punching, sorting, and tabulating machines.

Automatic Bar Push-up Solves Cutting-Off problem

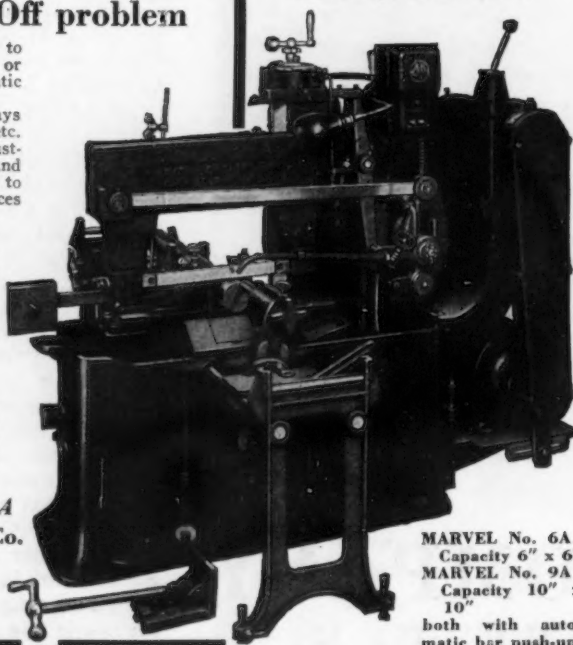
Wherever duplicate pieces are to be cut from bars, whether few or many, a MARVEL Automatic Saw is the thing.

It eliminates all costs and delays for special tools, stock rests, etc.—reduces setting-up to adjustments for length, speed and feed. It cuts running time to a fraction, will cut off 10 pieces 6" round steel or 160 pieces 1½" (other sizes proportionately) every hour floor to floor. It saves man hours—requires no more attention than an automatic screw machine—and, gets more pieces per bar for chip loss is reduced to the thickness of a saw blade.

Fully ball bearing construction, these new heavy duty production saws have the stamina for continuous high speed operation. They are the last word in cutting-off equipment.

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MARVEL Automatic Sawing Machines



MARVEL No. 6A
Capacity 6" x 6"
MARVEL No. 9A
Capacity 10" x 10"
both with automatic bar push-up.

Predicts 1936 Auto Output at 4,612,034 Units

IN a statement issued last Wednesday, Secretary of Commerce Roper estimated automobile and motor truck production during 1936 at 4,612,034 units, based on the belief that output during the last quarter will be as many as 1,150,000 units. The estimated production for this year, compares with 4,601,041 units produced in 1928 and exceeds that of 1935 by nearly 500,000.

The American Forge Co. Berkeley, Calif., has filed an application with the Tariff Commission asking for an increase in the duty on forged steel grinding balls.

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The shafts pass!

Smoothly and uninterruptedly flows the power through
HYPOIDS - - because they have curved and
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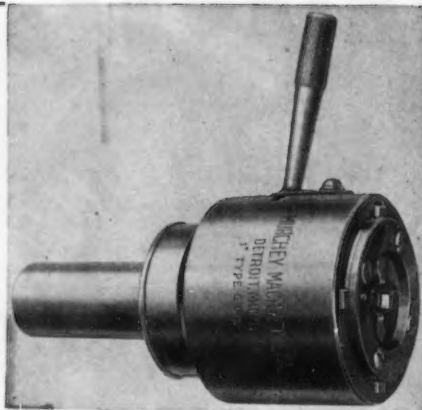
MURCHEY TYPE "G" Self-Opening DIE HEAD

Sizes 7/16" to 6"

This die head is the pull-off type for stationary spindles. It is opened positively and instantaneously by self-contained trips actuated either externally or internally.

Set-up time is reduced to a minimum by ample adjustments for thread diameters and by chaser removal which may be effected without taking off the cap.

In this die head all parts are hardened and ground.



For economy the chasers are interchangeable with the Murchey "C-O" rotating die head. This type "G" die head is rendering excellent service in shops where production is vital.

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Collapsible Taps, Self Opening Die Heads; Bolt Threading, Pipe Threading, and Pipe Cutting Off Machinery.

Plans for Old-Age Security Under Way

WASHINGTON, Nov. 10.—With the aid of 45,000 post offices, the Social Security Board has put into action in all parts of the United States the plan that will set up for 26,000,000 working men and women Social Security accounts

—comparable to annuity insurance—which will enable millions of these workers to retire at an age of 65 with a monthly income for life, the amount of income being based on previous wage records.

In these accounts all of the 26,000,000 persons estimated to be eligible will, starting Jan. 1, 1937, begin storing up cash values payable to the worker at 65 or to his

family if he dies before reaching the age of 65. These cash values will at all times be substantially larger than the worker's own contributions under the Social Security Act.

All persons working for salary or wages are eligible, excepting those engaged in agriculture, domestic service in private homes, Government service and in a few other excluded occupations. It is expected that many of those in occupations not now covered will eventually become eligible through occasional or part-time work in those occupations which are covered.

The Social Security Board emphasized the fact that, while this undertaking is of unprecedented proportions, the plan in which 45,000 post offices are now cooperating with the board is quite simple and will be conducted with all possible convenience to employers and employees.

Plans have been carefully made, the board said, for delivery of the necessary forms and instructions to all employers and employees affected within the next few weeks. The board urged both employers and employees, as well as the public at large, to refrain from making inquiries either of the board or at post offices, concerning their respective parts in the plan until after receipt of the official forms and instructions.

Application Procedure

After that, the board said, postal authorities in any community and representatives of the Social Security Board in the larger cities and industrial centers will be available to answer all questions and to render any other assistance that may be necessary.

The plan is simply this, the board's announcement said:

Beginning on Nov. 16, post offices throughout the country will distribute to employers a form known as the "Employer's Application for Identification Number." This form will ask of the employer only seven simple questions, answers to which will enable the Post Office Department to know how many employees' application forms to deliver to each employer.

Then, beginning on Nov. 24, post offices throughout the country will distribute to employees, through their employers, forms known as "Application for Social Security Account Number." These employees' application forms will be distributed to all work places and will also be available, after such distribution, at all post offices. Local postmasters will announce when these forms are available. The

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employee's application is a simple form asking a few questions such as name and address of the worker, name and address of his employer, the date and place of birth, and father's and mother's name. When the worker has provided this information on the application he may return it, without paying any postage, in any of the five following ways: By handing it back to the employer; by handing it to any labor organization of which the worker is a member; by handing it to a letter carrier; by delivering it personally to any local post office; or by mailing it, without postage, in a sealed envelope addressed simply: "Postmaster, Local."

On the return of this information to the post office, a Social Security account will be set up for each person eligible and he or she will be furnished a card—comparable to an insurance identification card—certifying that an account has been set up and bearing the number of the employee's Social Security account so as to make it easy for the worker to find out at any time just how his or her account stands.

Japan is Short of Pig Iron and Scrap

WASHINGTON, Nov. 10.—Shortage of pig iron and scrap supplies in Japan is disclosed in a report made recently to the Department of Commerce. It is stated that the result of this scarcity has been an advance in domestic pig iron quotations, which are, however, believed to be as yet somewhat under the current world market prices. The evident shortage of scrap in Japan since the early part of 1936 was somewhat alleviated by large imports during July and August. However, current stocks are said to be abnormally low, and efforts are being made to find a source of supply in other than the American market, inasmuch as quotations here have advanced to comparatively high levels.

Production of pig iron in Japan and Korea satisfies only approximately two-thirds of the domestic demand, the remainder being imported from Manchuria, British India and Soviet Russia. The Japan Steel Co. maintains a practical monopoly over domestic production and acts as exclusive distributor of imported pig iron.

Imports of pig iron into Japan during the first eight months of 1936 totaled 685,000 metric tons of

which 375,000 tons came from Manchuria and 310,000 tons from other countries. It is said by the Commerce report that negotiations are progressing with representatives of the Soviet government for additional large purchases over the balance of the year.

The statement that Japan is seeking sources of scrap other than the United States because of the rising prices here appears to find confirmation in the fact that Japan is drawing increased scrap sup-

plies from such countries as South Africa, Netherlands, India, New Zealand and Nicaragua. While Japan continues to be the largest export market for American scrap, the trend of the movement has been downward. Shipments of scrap to Japan in September declined to 127,984 tons from 147,080 tons in August. In the first nine months of the current year exports of scrap to Japan totaled 919,506 tons compared with 983,979 tons in the corresponding period of last year.

New 1937 Lathes

THE new 1937 Series South Bend Lathes are recommended for the finest and most accurate work in the tool room, machine shop, manufacturing plant, and laboratory. Offered in sizes 9" to 16" swing, in bed lengths from 3' to 14', Motor Drive and Countershaft Drive.

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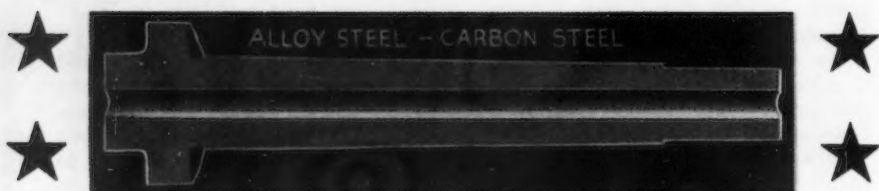
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Freight Rate Increases on Steel, Coke and Scrap Protested

WASHINGTON, Nov. 10.—Iron and steel and by-product coke producers and iron and steel scrap dealers have filed protests with the Interstate Commerce Commission

against the proposal of the railroads to readjust the freight rate structure.

In their petition the railroads have asked for new rates, effective

Dec. 31, upon the expiration of existing surcharges which the commission has ordered eliminated on that date. The proposed rates generally would be somewhat less than prevailing rates with surcharges.

The carriers seek an increase of 10 per cent, with a maximum of 1c. per 100 lb., or 20c. per ton, net or gross, as rated on iron and steel products. On coal and coke, varying increases in rates, dependent upon the territories affected, but for the bulk of the tonnage the proposed increase is 10c. per net ton. To replace the surcharge of 7 per cent with a maximum of 2c. per 100 lb., the railroads propose new column and commodity ratings on scrap. Within, from and to Western territory where column scrap ratings of 15 per cent and 12½ per cent at minimum weights of 50,000 and 75,000 lb., respectively, apply, it is proposed to cancel the 12½ per cent column rating at the 75,000 lb. minimum. Within Western territory and from and to Western territory, it is proposed to increase commodity scrap rates 20 per cent with a maximum of 40c. per ton, net or gross, as rated. In other territories it is proposed to increase commodity rates 10 per cent with a maximum of 1c. per 100 lb., or 20c. per ton, net or gross, as rated.

Steel and Coke Rates Protested

Protests against the proposed iron and steel rates have been jointly filed by the Andrews Steel Co., the Newport Rolling Mill Co., and the Globe Iron Roofing & Corrugating Co., Newport, Ky. These iron and steel makers declare that the present level of iron and steel rates throughout Official Classification territory represents the absolute maximum of just and reasonable rates.

In a joint protest with public utility interests, a number of iron and steel manufacturers protest against proposed increased rates on by-product coke. The iron and steel companies are Republic Steel Corp., Youngstown Sheet & Tube Co., Inland Steel Co., Wheeling Steel Corp., and the Interlake Iron Corp. Others joining in the protest include the Donner-Hanna Coke Corp., Buffalo, and the Semet-Solvay Co., New York.

These protestants point out that the increases proposed will apply not only to coke, but also to bituminous coal, and that higher rates would burden them with a double increase. Practically all of the coal they use is produced in the Crescent fields of the Eastern portion of the United States and is shipped by rail. The protestants point out that in the sale and distribution of by-product coke, com-



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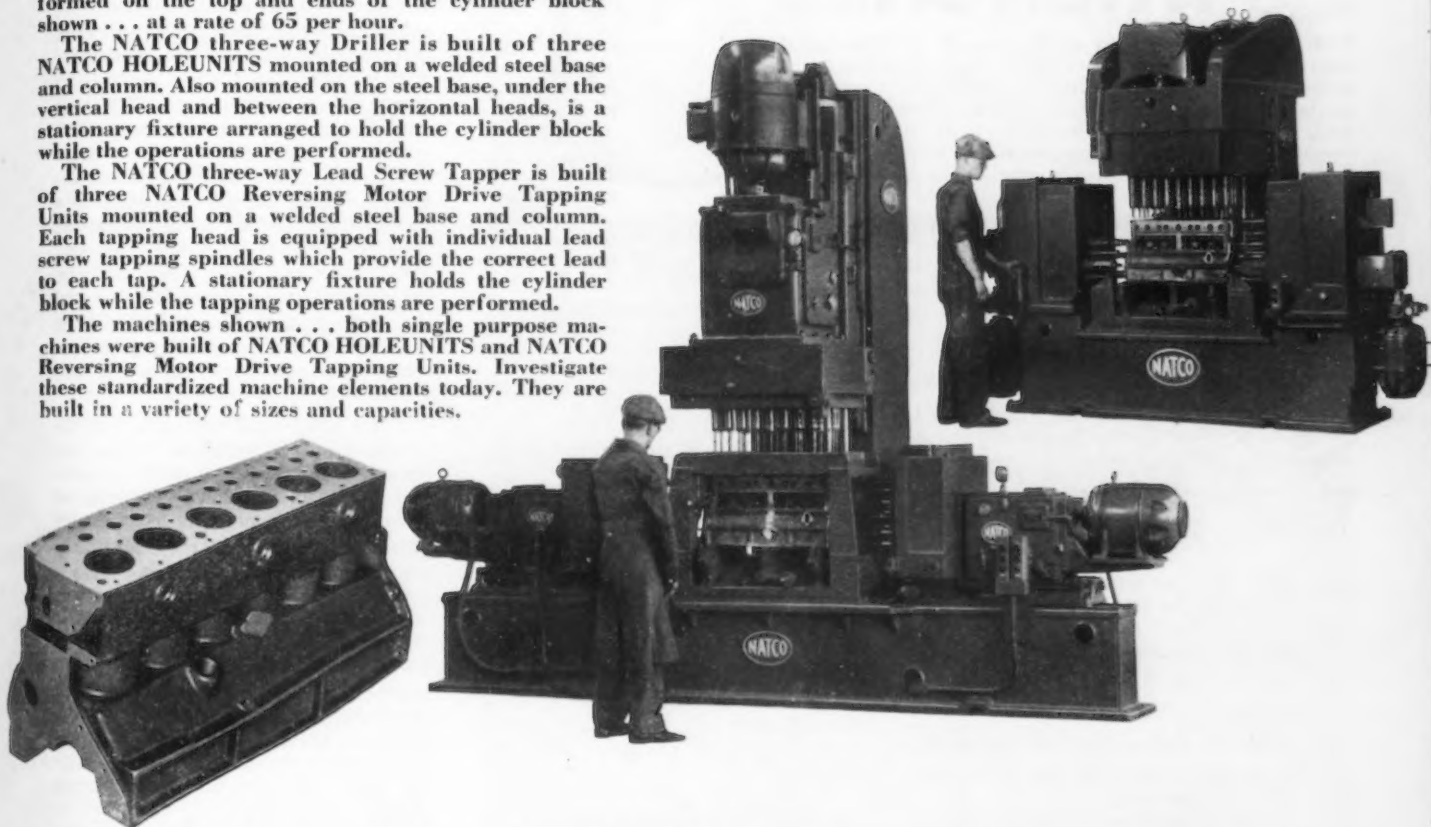


52 drilling and 48 tapping operations are being performed on the top and ends of the cylinder block shown . . . at a rate of 65 per hour.

The NATCO three-way Driller is built of three NATCO HOLEUNITS mounted on a welded steel base and column. Also mounted on the steel base, under the vertical head and between the horizontal heads, is a stationary fixture arranged to hold the cylinder block while the operations are performed.

The NATCO three-way Lead Screw Tapper is built of three NATCO Reversing Motor Drive Tapping Units mounted on a welded steel base and column. Each tapping head is equipped with individual lead screw tapping spindles which provide the correct lead to each tap. A stationary fixture holds the cylinder block while the tapping operations are performed.

The machines shown . . . both single purpose machines were built of NATCO HOLEUNITS and NATCO Reversing Motor Drive Tapping Units. Investigate these standardized machine elements today. They are built in a variety of sizes and capacities.



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petition must be met from raw coal direct to the fuel market, from petroleum fuel oil and from natural gas as domestic fuels. The double increase in rates, it was stated, would not apply to competitors.

Chicago Scrap Dealers Complain

Protests against the proposed scrap rates have been filed jointly by Briggs & Turivas, Erman-Howell & Co., Inc., Hyman-Michaels

Co., M. S. Kaplan Co., and Price Iron & Steel Co., Chicago. These dealers declare that any permanent increase on scrap iron in addition to being unreasonable in itself will, due to the different treatment in the different rate structures, result in discrimination between those in the industry.

The protest against the proposed increase in iron and steel rates quotes from a 1929 decision of the

commission in the general iron and steel rate increase case, in which it is stated: "It is evident that **** what the traffic can or will bear is a factor which must be given due consideration. In other words, if agricultural products and livestock are to receive the benefit of the lowest possible lawful rates compatible with the maintenance of adequate transportation service, commodities, such as iron and steel articles **** which are able to bear relatively high rates, must be accorded rates which approach but which do not exceed reasonable maxima." The steel makers declared, based on the commission's observation, it is quite apparent that the Official territory iron and steel rates as prescribed by the commission were intended to and did represent to the fullest extent the then (1929) unusually prosperous steel industry's share of the transportation burden.

"The steel industry suffered severely from the effects of the depression and is not now in a position to stand a general permanent increase in the present rate structure which was prescribed as maximum at a time of the industry's greatest prosperity," the petition says. Request is made that the carriers' petition be denied, but that if it is not denied the proposed rates on iron and steel products from Newport to destinations in Official territory be suspended pending hearings. Similar requests are made in other protesting petitions.

The Sharon Steel Co., Sharon, Pa., in protesting against the proposed rates especially directs its objection to those that would apply to raw materials. It points out that the transportation cost of raw materials, particularly iron ore, is a vital factor in the success of the company's business. Recognition of this factor, it is stated, is general in the steel industry, as has been demonstrated by the trend of new steel plant construction to localities, such as Lake front, where, it says, transportation costs for raw materials are most advantageous. It estimates that the company's added cost of the proposed freight charges would be \$100,000 a year.

The carriers propose rate increases of 6c. per gross ton on iron ore from mines to upper Lake ports and 6c. per gross ton beyond lower Lake ports to interior rail destinations, including Sharon, Pa., and Lowellville and Struthers, Ohio.

Double Increase on Coke

The petition of by-product coke producers says that because 1.4 tons of coal are required to produce one ton of coke, they would generally be required to pay an added

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cost of 14c. per ton on their raw product. The coke rate increase by a maximum of 10c. per ton in Central territory, when added to the 14c. accumulated increase on coal, it is pointed out, would generally produce an accumulated increase of 24c. for these producers on each ton of coke which they would attempt to sell, compared with 10c. per ton for competing bituminous coal and 14.8c. for competing fuel oil. In Western territory it is proposed to increase the coke rate to a maximum of 15c. per ton. The protestants also object that the increases proposed on coal and coke are even slightly higher than those accruing under the emergency charges and that the railroads would be receiving something near 70 per cent, estimated at \$35,000,000, of their added revenue from coal and coke. It is contended that the increased rates would result in an enormous decrease in revenue from coal and coke transportation.

Berry Calls Meeting; NRA Revival Hinted

WASHINGTON, Nov. 10.—The invitation sent out yesterday by George L. Berry, industry coordinator, to industrialists and organized labor leaders to attend a conference in Washington Dec. 6 is taken to be further evidence that the administration is planning revival of NRA. Berry's invitation said the conference has been called to consider plans for eliminating "unfair trade practices and unfair labor practices."

Berry's first conference in December of last year collapsed before it got well under way. Many think the forthcoming conference will be a duplicate of that of last year.

Walsh-Healey Ruling Affects Dealers

WASHINGTON, Nov. 10.—Where a dealer quotes a manufacturer's price on a Government contract and instead of filling it from his own stock has the factory ship direct to the Government, the manufacturer will be required to conform to the provisions of the Walsh-Healey Act. This ruling was approved yesterday by Secretary of Labor Frances Perkins in passing on agency contracts. The dealer under such a circumstance, according to the ruling will be deemed an agent acting for an undisclosed principal and the manu-

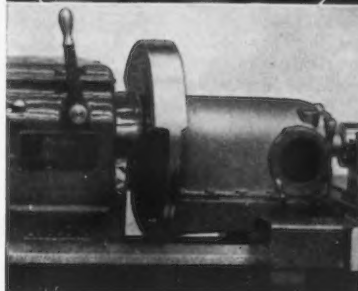
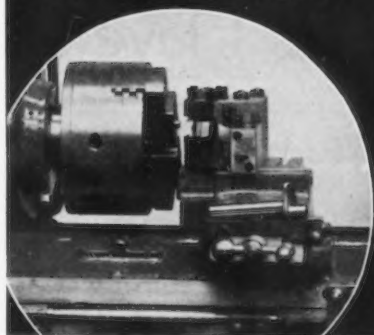
facturer will be deemed to be a party to the contract.

Miss Perkins also approved a ruling which prohibits all encroachments upon the minimum earnings of employees and therefore forbids deduction of rent in the case of company-owned houses, medical expenses, dues for benefit associations, etc., where such deduction causes the net wage to fall below the minimum. It was held, however, that the act does not forbid

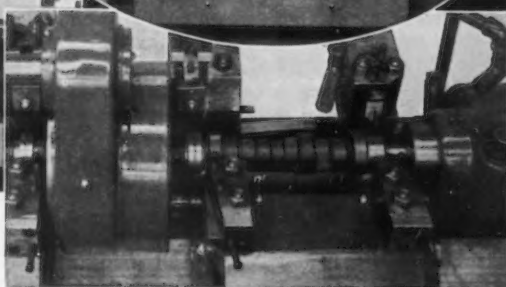
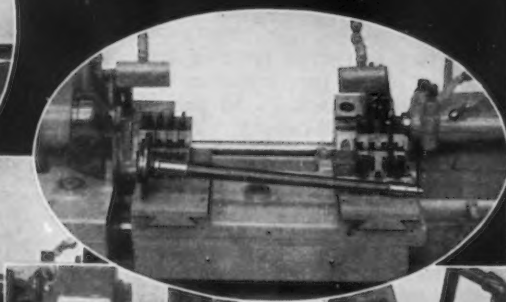
deductions so long as the wage does not fall below that level. This ruling was made in response to a question raised by textile manufacturers who were told that section I (b) of the Walsh-Healey Act requiring the payment of the minimum wages fixed in the contract "without subsequent deduction or rebate on any account" is not limited to wage kickbacks but is intended to prohibit "all encroachments upon the minimum earnings of employees."

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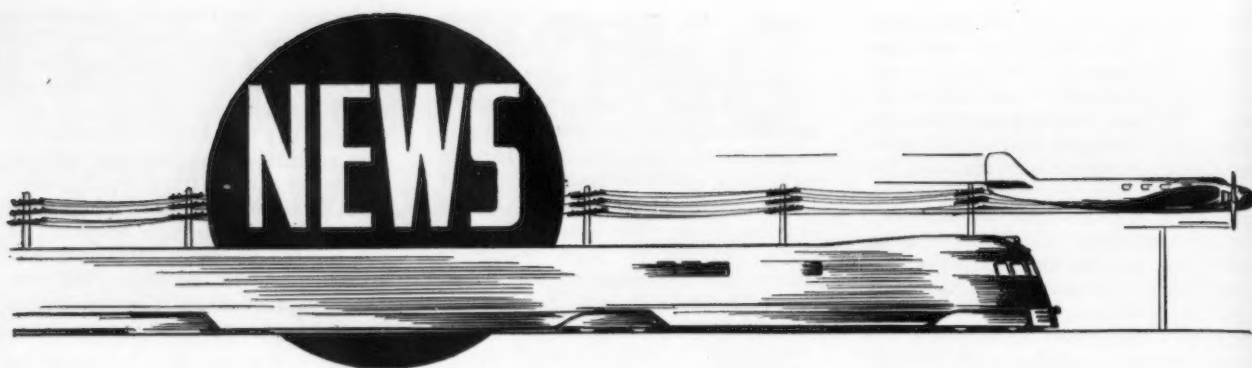


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Steel Companies Offer Wage Advances; Some Employees Have Not Accepted

CLIMAXING negotiations lasting several months, major steel companies late last week offered employees, through their employee representatives, wage increases ranging from 11.7 per cent for common labor to slightly less than 10 per cent for other classifications. The offer of Carnegie-Illinois Steel Corp. contained a provision by which wages are raised or lowered depending on the cost of living. Total increases will average 10 per cent of the steel industry's present payroll and when effective will add about \$60,000,000 to \$65,000,000 annually to the industry's wage bill. The increases when accepted will take effect Nov. 16, 1936.

While the majority of employees in the steel industry have accepted the wage increase offer, employee representatives of some Carnegie-Illinois Steel Corp.'s plants have refused to accept it as it now stands. In the Carnegie-Illinois set-up, a contract for one year is involved.

The General Employee Council, composed of 34 employee representatives who are acting for more

Steel Employees Answer Lewis

THE 10,000 workers at Carnegie-Illinois Steel Corp.'s Homestead plant issued the following attack on John L. Lewis for his criticism of the steel wage increase:

"The 10,000 workers at Homestead doubt whether John L. Lewis and Philip Murray (head of the SWOC) really believe that the \$60,000,000 pay boost by the steel industry is what they call a 'miserable concession.'"

"Of course Mr. Lewis' interest in any pay increase is how many more members and how much more dues he can get for his unions and himself.

"Mr. Lewis would get about \$6,000,000 annual dues if he were able to get the 500,000 steel workers to pay dues of \$1.00 a month.

"\$6,000,000 would take just about 10 per cent of the increase obtained by Homestead and other employees representatives beginning Nov. 16.

"Does Mr. Lewis really feel that \$6,000,000 in dues would be a miserable amount of money?

"The Homestead workers doubt that Mr. Lewis and Mr. Murray really believe that \$6,000,000 is a 'miserable amount' or that the \$60,000,000 pay increase is a 'miserable concession.'"

than 60,000 Carnegie-Illinois employees in the Pittsburgh-Youngstown district, are in conference with their management at Pittsburgh this week, taking up the question of wage contracts. This committee has full power to bargain collectively for their constituents.

At the present time over half of the Carnegie-Illinois employees through their representatives have accepted and signed the wage contract, but at least 50,000 more employees through their representatives have balked on two points, the contract itself and the feature of tying in the wage increase with the cost of living index.

It is possible that, even though some of the representatives might not sign the contracts, the company will grant the wage increases the same as if the agreements were signed. On the other hand, the General Committee meeting this week is attempting to get better than a 10 per cent raise.

At the General Employee Committee meeting held for organization purposes on Monday night, Elmer J. Maloy, worker in Car-

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The above Elwell-Parker combined Lift Truck and Crane is one of 2 owned by a company that bought as many as it needed—and *that gets its work done on time*, at lowest transportation cost. This firm—a large Cleveland producer of bearings, bushings, and kindred products—keeps its Trucks busy all day.

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Careful study at the outset proved that combined Platform and Crane Trucks best fitted this customer's needs—Elwell-Parker supplied them. Bring your own material-handling problems here, and Elwell-Parker will co-operate with the same satisfactory results.

Profit by the Company's long, successful pioneering experience by contacting Elwell-Parker, 4225 St. Clair Avenue, Cleveland, Ohio.

New Type **ELWELL·PARKER** *Trucks*

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negie-Illinois Duquesne works and rabid pro-Lewis leader, was elected chairman, by a vote of 19 to 15, of this General Employee Committee representing over 60,000 Carnegie-Illinois workers.

The increase for common labor in the East will take the rate for this type of work from 47c. to 52½c. per hr., while inside common labor now rated at 48½c. will be raised to 54c. All other rates will be advanced to such an extent that the percentage increase will approximate slightly less than 10 per cent and will involve the adjustment of many wage scales in order to eliminate inequalities. Some of the present offers include only those white collar workers who are represented in the employee representation plan. Those so affected are few in number and

include clerks and similar type of employees located in steel mill plants. However, certainty that all other medium salaried workers will be given advance in pay is reflected in the announcement of the Carnegie-Illinois Steel Corp. that a separate agreement will be negotiated for white collared workers not covered in last week's offer. It is expected that other steel companies which have not already signified their intent to raise medium salaried employees will do so when the corporation plan is announced.

Cost-of-Living Factor to be Used in Future

Outstanding feature of Carnegie-Illinois Steel Corp.'s wage offer is the provision that additional wage increases are tied in

with the cost of living as reflected by the U. S. Bureau of Labor index furnished by that department quarterly. In the typical agreement extended by the Carnegie-Illinois company to employee representatives it was pointed out that the present wage adjustments are given to compensate, in advance, any subsequent rise in the cost of living up to 10 per cent from the July 15, 1936, figure which stood at 82.0. If the cost of living rises, within the next year, 5 per cent above the 10 per cent anticipated by the present wage increase, then a 5 per cent wage adjustment will be made and, likewise, if the cost of living after having risen 10 per cent above July 15, 1936, should then decline a full 5 per cent, a downward wage adjustment of 5 per cent will be made. This means that if the cost of living does not rise 10 per cent above the July 15, 1936, figure of 82.0 to an index of 90.2 at any time within the next year, increases granted to employees will remain unchanged. If during the year the cost of living index should rise to 94.7 then a further 5 per cent increase in wage levels will be made. On the other hand, should the index, having reached 90.2, decline to 85.7 there would be made a general wage decrease of 5 per cent from the levels established as of Nov. 16.

So far, United States Steel is the only major steel company to include the cost of living index in its offer to employees. It was this particular factor which acted as a stumbling block in an unanimous acceptance of the company's offer. The fact also that the wage increases were for a definite period of time, (one year) was not satisfactory to some representatives. Some groups opposed the wage plan on the ground that it should be based on profits rather than the cost of living, while others felt that the workmen should not be required to make a year's agreement because of the uncertainty of business and labor developments. These two considerations, temporarily at least, are keeping the Carnegie-Illinois sheet and tin plate committee from approving the offer on behalf of their 25,000 constituents.

All Leading Companies Have Announced Advances

The wage announcements were led by Columbia Steel Co., Pacific Coast subsidiary of the United States Steel Corp. Bethlehem Steel followed with an advance of 5½c. per hr. in common labor rates without the sliding scale provision, lifting pay when living costs go up. American Steel & Wire Co., another United States Steel Corp. subsidiary, raised wages 10 per

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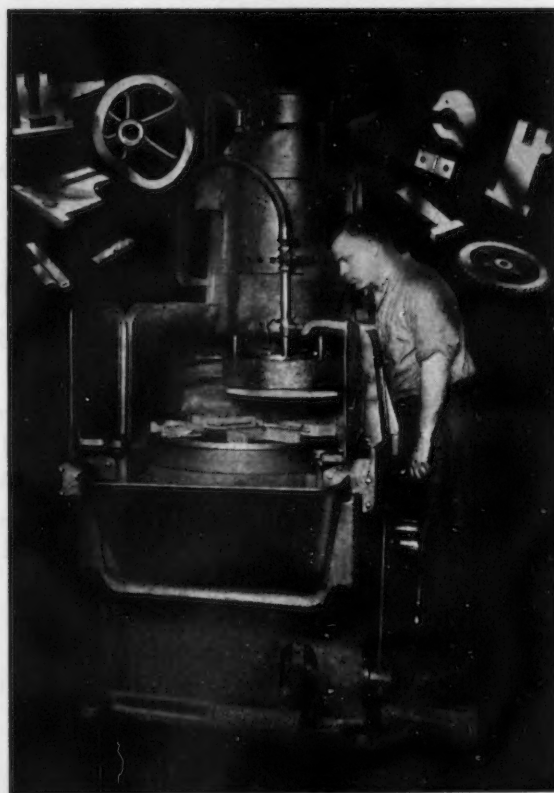
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cent with the sliding scale provision. The Jones & Laughlin Steel Corp. in its offer provided for a 5½c. per hr. increase for all employees earning from 47c. to 55c. per hr., inclusive, while other wage rates are to be raised so that the total average increase will be 10 per cent. This company also included in the offer those white collared workers making under \$4000 a year who are represented in the plan of employee representation. Similar announcements were made by National Steel Co. and its subsidiaries, and other large companies including Republic Steel Corp. quickly fell into line.

The introduction of the cost of living into wage computations is not only new in the steel industry

but is a major forward step in the protection of the wage earner's pay against a too rapid rise in the cost of living. The General Electric Co. has a plan embodying cost of living fluctuations while the Westinghouse Electric & Mfg. Co. inaugurated a wage plan policy recently which affects employees' income, depending on the rise and fall of the company's earnings.

With average wage rates under the new set-up above those of 1929 and the cost of living now 17 per cent below 1929, it can easily be seen that a substantial rise in real wages has been accomplished. Even though the July 15, 1936, cost of living index figure of 82.0 should rise to 90.4, the cost of living at that point would still be nine points below the level existing in 1929, at

which time the index averaged 99.4. This would still indicate a rise in real wages over those paid in 1929. This is one fact overlooked by those such as the Committee on Industrial Organization, which is criticizing the tying up of future wage increases or decreases with the cost of living index.

C. I. O. Attempts to Take Credit

At its meeting in Pittsburgh late last week the C.I.O. attempted to take the credit for the wage increase, saying that the wage adjustments were made by steel companies in an endeavor to defeat union organization activities. This contention, however, was refuted some time ago by the Carnegie-Illinois Homestead Works' wage committee whose statement in *THE IRON AGE* of Oct. 1, 1936, read in part, "... in the meantime, however, certain officials of outside groups, apparently sensing that the employee representatives may be nearing a satisfactory settlement of this issue and attempting to place themselves in a position that they can usurp the credit for the same, have released certain newspaper articles to the public press that would infer that they are prepared to take over the employee representatives lock, stock and barrel. . . ." That other representatives expected the C.I.O. to take credit for any wage increases which might materialize is reflected by the comments of F. W. Bohné, employee chairman of the Pittsburgh district council of Carnegie-Illinois employee representatives who said in *THE IRON AGE* of Nov. 5, 1936, "... if and when wage increases are granted, it will be because of the effectiveness of the plan of employee representation and not because of the activities of outside agencies. . . ."

Practically all employee representatives in the Carnegie-Illinois Steel Corp. had attempted to get a wage increase which would establish a \$5 a day minimum for common labor and equitable increases for other workmen. The fact that the present offers are below these demands is the major reason for the refusal on the part of some committees to accept the wage agreements as they now stand.

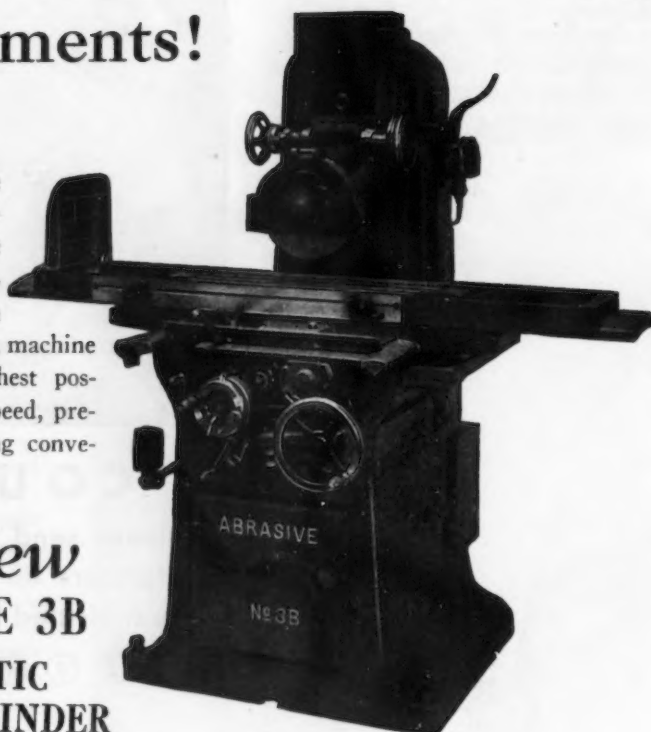
A typical agreement as entered into by employee representatives and Carnegie-Illinois management follows. The agreement in each case was signed by representatives and the general superintendent of the plant involved.

"The management and the employee representatives of the Carnegie-Illinois Steel Corp., Homestead Works, after conferences and negotiations, jointly agreed to the

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following wage adjustments affecting all wage earners employed at the Homestead Works.

"1—The adjustment of rates herein agreed to shall become effective Nov. 16, 1936, and shall be in effect for one (1) year from date, and shall be subject to modification or extension at its expiration.

"2—Basic common labor rate now fixed at 47c. per hr. shall be increased to 52½c. per hr.

"3—Basic mill turn labor rate now fixed at 48½c. per hr. shall be increased to 54c. per hr.

"4—Including the above adjustments, the rates of other occupations shall be increased to such an extent that the total over-all increase of the plant payroll for wage earners shall be approximately ten (10) per cent of its present total.

"5—In the treatment of rates, other than common labor and mill turn labor, due regard shall be had of present inequalities of those occupational rates which are out of line with each other.

"6—In making the wage increase, consideration will be given to recognized inequalities that now exist in the present wage structure, so that occupations where rates are found to be low can be given more than the average increase, which will mean some slight reduction in the increase for the remainder, with the result that the whole wage structure will be brought more nearly into line.

"7—The management and the employee representatives further agree, should there be a marked increase in the cost of living during the year subsequent to Nov. 16, 1936, that general wage levels shall be adjusted thereto on the following basis:

"A—The change in the cost of living shall be determined by the index of the cost of living as now compiled and published by the Bureau of Labor Statistics of the United States Department of Labor and that index, as of July 15, 1936, shall be considered as the base on which subsequent changes shall be indicated.

"B—The wage level in effect shall be considered as the base from which subsequent adjustments shall be made, if, as, and when indicated by changes in the cost-of-living index.

"C—The general wage adjustment effective Nov. 16, 1936, which will approximate an over-all increase in the total wage payroll of ten (10) per cent shall be taken to compensate in advance any subsequent rise in the cost of living up to ten (10) per cent from its July 15 base.

"D—As a practical measure, the minimum change in the cost of living upon which wage adjustments shall be indicated shall be five (5) per cent. In other words, general wage rates shall not be further revised, after Nov. 16, 1936, until the cost of living has changed a full five (5) per cent from the increase of ten (10) per cent over the July 15 base.

"E—If, as, and when the cost of

living rises or falls a full five (5) per cent after having increased ten (10) per cent over the July 15, 1936, base, a corresponding wage adjustment of five (5) per cent shall be made, either upward or downward, from the then existing wage level.

"8—Management and the employee representatives agree that, notwithstanding any of the foregoing provisions, prompt consideration will be given to the adjustment of any specific job rate if the nature of that job or the responsibilities thereunder shall be changed during the term of this agreement.

Total Increase 10 Per Cent

"The above agreement may be summarized as raising common labor and mill turn labor from their existing rates of 47 and 48½c.

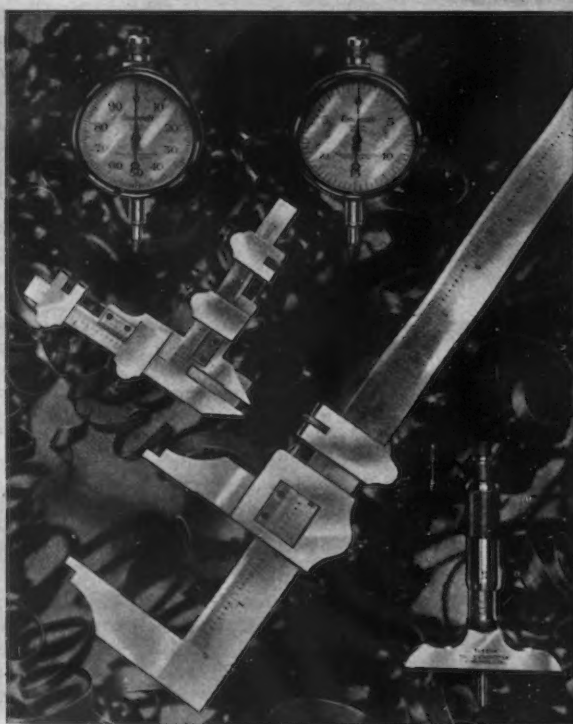
per hr., respectively, to 52½ and 54c. per hr., and adjusting other wages so that the total increase in the payroll shall amount to approximately 10 per cent.

"Rather than specifying a flat 10 per cent increase in all rates, however, there will be taken into consideration recognized inequalities of the present wage structure so that, within the limits of a 10 per cent over-all wage increase in the payroll, reached by increasing some rates more than others, the whole wage structure shall be brought more nearly into line with its true values.

"The adjustment thus made shall be in effect for a full year (except as individual job rates may be adjusted, because of changes in the nature or responsibilities of those

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jobs) provided wide swings beyond a 10 per cent increase in the cost of living as prevailing on July 15, 1936, do not occur.

"The adjustment of Nov. 16, 1936, is regarded as compensating employees, in advance, for an increase of 10 per cent in the cost of living as the United States Department of Labor figures indicated it to be on July 15, 1936.

Sliding Scale Explained

"If the cost of living rises another 5 per cent above this 10 per cent, then a 5 per cent wage adjustment will be made, and, like-

wise, if the cost of living, after having risen 10 per cent above July 15, 1936, should then decline a full 5 per cent, a downward wage adjustment of 5 per cent would be made.

"The United States Bureau of Labor Statistics cost-of-living index as of July 15, 1936, was 82.0 (which is computed by basing the average index for the years 1923-1925 as 100 per cent). The 10 per cent over-all wage adjustment on Nov. 16, 1936, will therefore cover, in advance, a possible rise in the index to 90.2. If during the year, the cost of living index should rise

to 97.4, then a further 5 per cent increase in wage levels will be made.

"If, however, the index, having reached 90.2, should decline to 85.7, there would automatically be made a general wage decrease of 5 per cent from the levels established as of Nov. 16, 1936.

"This arrangement represents the final conclusion of negotiations between the management and the employee representatives which have been conducted almost continuously during the past several months.

"The above contract was signed by M. L. McConnell, general superintendent, for Carnegie-Illinois and by members of the Homestead employee representatives wage committee."

This agreement was signed by Floyd Colledge, Ralph Martin, Joseph Frorlich, Emil Havrilla, William Bain, George Waldron, Peter Elicker, William Coombs, John Cattmel and John J. Wilson on behalf of the Homestead workers.

It is identical with agreements offered to most of the other company unions of United States Steel subsidiaries.

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Founders Convention Program Announced

A VARIED program, which includes addresses on many subjects of interest by prominent men, has been arranged for the fortieth annual meeting of the National Founders Association, Nov. 18 and 19, at the Waldorf-Astoria Hotel, New York.

Thomas W. Pangborn, president of the organization, who will speak Wednesday morning on "What Kind of Government Does the Business Man Want?" will be followed on the program by Dr. Virgil Jordan, president, National Industrial Conference Board, whose subject is as yet unannounced. "The Gas Hazards of Modern Industry" will be discussed at the Wednesday luncheon by Dr. Howard W. Haggard, associate professor of applied physiology, Yale University, while at the afternoon session talks will be given by Arnold Lunn, University of Notre Dame faculty member; J. A. Voss, director industrial relations, Republic Steel Corp.; Whiting Williams, Cleveland, and C. J. Stark, president, Penton Publishing Co.

Thursday, Dr. Francis F. Lucas, a member of the technical staff of Bell Telephone Laboratories, Inc., New York, will discuss "A Precision High Power Metals Microscope and Its Application to the Study of

Fatigue Cracks in Cast Iron"; Philip Drinker, professor of industrial hygiene, Harvard School of Public Health, will speak on "Uses and Limitations of Respiratory Protective Equipment"; and Roger Williams, New York, will close with a discussion of "Other Controllable Costs."

Kettering Addresses Detroit Engineers

THE first meeting of the newly organized Engineering Society of Detroit was addressed by Charles T. Kettering, vice-president in charge of research, General Motors Corp., on Oct. 30. John H. Hunt, director of the New Devices Section of General Motors and president of the Society, announced that the new group was starting off with 1026 members at its initial meeting, with 960 in attendance. This group represents a reorganization of the old Detroit Engineering Society, which has disbanded. The principal impetus for the reorganization came from a grant of \$500,000 from the Horace H. and Mary A. Rackham fund, which will provide an endowment to carry on general engineering activities in the Detroit area. The object of the new group will be to unite all engineers in a common group which will be addressed from time to time by outstanding men on general technical subjects. The society will in no way compete with the local sections of the various national engineering groups.

Mr. Kettering, in speaking of research along the lines of fundamental science, made a very apt analogy. "Let us imagine," he said, "that the room we are now in represents a great plain surrounded by four huge rock cliffs which represent the boundaries of our present knowledge. Over 100 years ago some fundamental researchers like Kelvin, Faraday and Watt scaled one cliff and broke off a large segment of rock which practical engineers began to rebuild into structures on the plain below. As a result of years of re-working, this stone has been reduced to pretty fine particles, and before we can progress much further, it will be necessary for some other fundamental researchers to ascend the cliff and break off another chunk of rock."

Mr. Kettering is very modest about his own knowledge. He still believes that we do not know anything about anything. For instance, he would like to have somebody tell him why glass is transparent.

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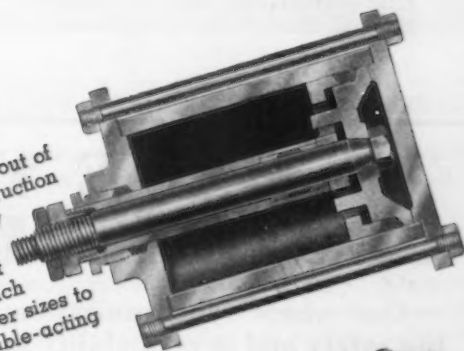
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British Building Boom Aids Steel

LONDON (*Special Correspondence*). The monthly figures for September of buildings for which plans were approved in the United Kingdom by the principal local authorities suggests that a gradual change-over is proceeding

from houses to factories in the building industry's activities. Dwelling houses show a slight decline as compared with September, 1935, whereas the cost of "factory and workshop" plans passed is up from £863,000 to £1,040,000.

This trend is important to the makers of constructional steel, which enters more into factory than into dwelling construction.

Already this section of the British steel industry is operating at a high level, quite apart from the general influence on the industry of immediate rearmament and incipient shipbuilding demand. The outlook is still brighter.

In 1932 the output in the United Kingdom of girders, joists and beams had fallen to 281,000 tons, as compared with 414,000 tons in 1929. By 1934, the last year for which exact particulars are available, production had recovered to 446,000 tons.

Moreover, a substantial portion of two other steel categories—sections, angles, etc., and rounds, squares, etc.—enters into building. Taking the three above-named categories together, output in 1936 will be close on 3,000,000 tons, as compared with 2,380,000 tons in 1935 and 2,080,000 tons in 1934. On the assumption that rates of increase in each of the three classifications have been fairly equal, it follows that this year's output of girders, beams and joists alone will be of the order of 600,000 tons, or more than double the production of the depression period.

Many steel manufacturers have their own constructional engineering subsidiaries (such as Dorman Long and Redpath Brown), but there are a number of important more or less independent firms whose earnings since the depression have undergone remarkable recoveries.

The British Steelwork Association has done a great deal of work recently in promoting the use of steel in building, and the industry is not troubled to any extent with competitive price cutting. Architects tend increasingly to get designs for steelwork prepared by constructional concerns, who are not uncommonly invited to tender on the basis of drawings prepared by one of their competitors. This practice has naturally fostered co-operation among structural steel concerns.

In contradistinction to the indications of prosperity in constructional steel, it is noteworthy that another steel product which enters into building—namely, galvanized sheets—is not doing so well. Galvanized sheets, which are normally used extensively in agricultural and factory roofing, have suffered from the competition of asbestos cement. British consumption at present may be put at 125,000 tons a year, against 130,000 tons in 1929.

The real trouble, however, has been loss of export business as a result partly of the establishment of new plants overseas, but chiefly because of the impoverishment

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during the depression of the pastoral and raw material producing countries. In 1936 exports have been running at the rate of under 300,000 tons a year, against 700,000 in 1929. In this building section of the steel industry the only hope is that the present upward trend of commodity prices will gradually enable overseas farmers and other producers to catch up arrears in roofing.

Electro-Motive to Spend \$750,000

ELECTRO-MOTIVE CORP., La Grange, Ill., subsidiary of General Motors Corp., has awarded a contract to the Austin Co., Cleveland, for a 504-ft. extension to the main erection and machine shop bays of its plant. This extension will complete the original plan for this part of the plant and will provide 84,000 sq. ft. of additional floor space for use in the manufacture of diesel locomotives. The building extension and its equipment, it is stated, will involve an expenditure of approximately \$750,000.

Dr. Albert Sauveur Corrects Citations

DR. ALBERT SAUVEUR, dean of American metallurgists, who cited 22 outstanding world metallurgists for distinctive services in an address before the Institute of Metals and Iron and Steel Divisions of the American Institute of Mining and Metallurgical Engineers in Cleveland recently, has requested THE IRON AGE to reprint the following paragraphs, which were incorrectly phrased in our report in the issue of Oct. 29, p. 34C: (The errors occurred through faulty transcription of hand-written copy.)

Dimitri Tschernoff—famous Russian metallurgist who with crude appliances and at a time when metallurgy was emerging from the dark ages, but with a clear mind, studied the dendritic structure of castings and the rational of the hardening of steel by rapid cooling.

Floris Osmond—Torch bearer of the science of metallography, a prince in the field in which he labored. Through his discovery of the upper critical points of steel, he established the allotropy of the element iron. His early description of the microscopical constituents of steel has remained classical.

Roberts-Austens—English teacher, chemist and metallurgist who explained to us the constitution of



...and the delicious soup at dinner

It's a far cry from the svelt dining room of your club, or the gracious comfort of a well-appointed home to the Gargantuan blending kettles and pipe lines of a modern canning factory.

It's just as far from the shining sanitation of the cannery to the fumes, the dust and the clamor of the pouring floor of a steel foundry.

Stainless steel—without it mass production in the food industries would be seriously handicapped by the old bug-a-boo, corrosion. In pipe lines, filter presses and a score of places, castings made at Lebanon from corrosion resistant steels resist the action of fruit acids and guard the flavor and the purity of the nation's food supply.

A Cure for "Corrosion Headaches": If corrosion is one of the headaches in your plant you may profit by following the lead of the food industries and turning to Lebanon for sound information and advice.

Your engineers will not only find Lebanon metallurgists familiar with the new alloys, but, of equal importance, they will find that Lebanon engineers and foundrymen have developed practical methods for handling these difficult alloys and producing them satisfactorily in commercial quantities.

Suggest to your technical men that they take advantage of the unique experience which is the background for Lebanon's reputation and success.

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alloys and took an active part in the development of the iron-carbon diagram.

J. O. Arnold—An Irish professor and metallurgist with an Irish temper, who conceived the existence of the carbide of iron. A pioneer in the use of vanadium in steel. An implacable enemy of beta iron.

Rosenhain—A brilliant English metallurgist and physicist. An independent thinker, bold in his attacks on theories he considered ill-founded. He disclosed to us the mechanism of plastic deformation of metals and took an important part in the development of the iron carbon equilibrium diagram.

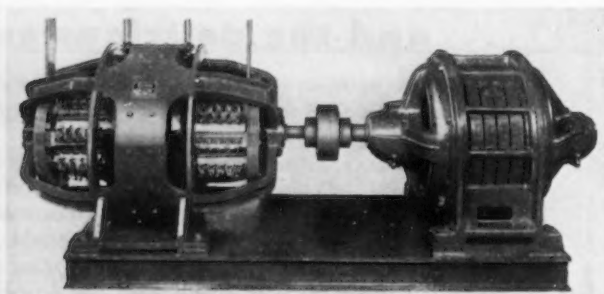
Morehead Medal to Dr. D. S. Jacobus

THE Morehead Medal for 1935 has been awarded by the International Acetylene Association to Dr. David Schenck Jacobus for his outstanding leadership in the form-



DR. D. S. JACOBUS

for the
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FULL-LOAD
OPERATION**
required in
**STRIP PLATING
PICKLING
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COLUMBIA LOW VOLTAGE GENERATORS

ulation of codes and procedures which have made fusion welding acceptable. The medal will be presented during the 37th annual convention of the association, to be held at the Hotel Jefferson, St. Louis, Nov. 18-20.

Established in 1922 by the Hon. John Motley Morehead, former United States Minister to Sweden, in honor of his father, the late James Turner Morehead who, in 1892, sponsored the experiment which led to the discovery of the electric furnace method of producing calcium carbide, the Morehead medal is awarded annually to the person or persons judged to have done most to advance the industry or the art of producing or utilizing calcium carbide or its derivatives.

Dr. Jacobus was born at Ridgefield, N. J., Jan. 20, 1862. He was graduated in 1884 from Stevens Institute of Technology, where he remained from 1884 to 1906 to teach experimental mechanics and engineering physics. In 1906 he received a degree of doctor of engineering from the same university and soon thereafter joined the Babcock & Wilcox Co. as advisory engineer. He now heads the engineering department of that company.

Dr. Jacobus has written many papers and is considered one of the world's authorities on steam engineering. His interest in the oxy-acetylene process dates back to 1897, when he experimented with the uses of the oxy-acetylene torch. These early experiments, at the time that carbide was first made, proved highly interesting and demonstrated the high heat value of the oxy-acetylene flame. For a number of years Dr. Jacobus reported on all the acetylene generating machines that came before the New York Board of Underwriters for approval.

Dr. Jacobus is a member of many engineering and scientific societies, and has served as president of the American Society of Mechanical Engineers, American Society for Refrigerating Engineers and for three terms as president of the American Welding Society. While president of the A.S.M.E., he was one of the organizers of a series of military lectures on preparedness, and later became a member of the Military Engineering Committee organized to arouse engineers to the need of preparedness and to instruct them in military tactics. One of his outstanding activities was in connection with the A.S.M.E. Boiler Code Committee, which he joined in 1914, later becoming chairman of its executive committee and, more recently, chairman of the committee. He has taken a leading part in formulating rules that recognized fusion welding for pressure vessel construction which, upon subsequent development in 1931, led to the present comprehensive rules in the Code for Fusion Welding of Pressure Vessels and Boiler Drums and Shells. Success of these particular rules led to other codes covering welded construction.

Tin Plate Census Lists Output Gain

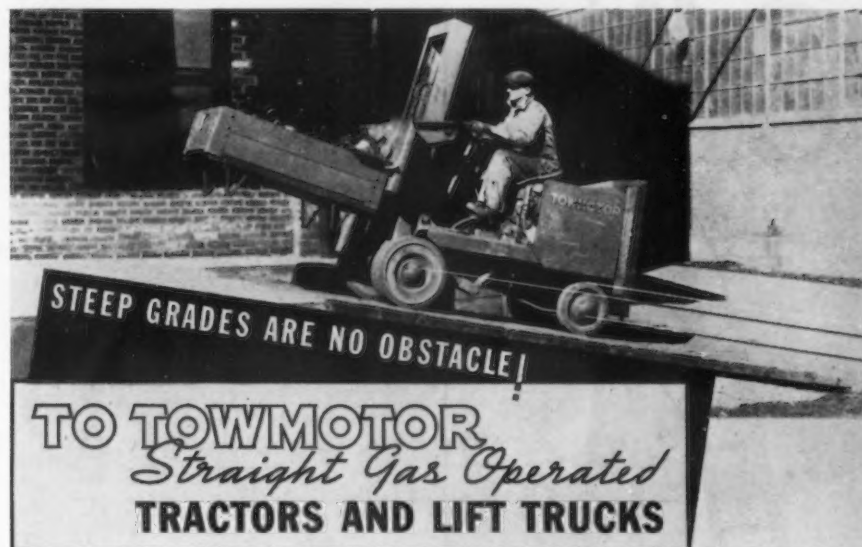
THE production of tin plate increased slightly and the production of terneplate more than doubled in 1935 as compared with 1933, according to data collected

this year in the biennial Census of Manufactures by the Bureau of the Census. Combined production of the two kinds of plate in 1935 amounted to 4,217,861,527 lb., of which 3,789,159,497 lb. was tin plate and 428,702,030 terneplate, including long terne. This was a combined increase of 6.4 per cent over 1933. Its value, amounting to \$192,319,153, represented an increase of 29.3 per cent.

While the 1935 output of both kinds of plate rose over 1933, com-

pared with 1929 the production of tin plate last year decreased 6 per cent in quantity and 9.5 per cent in value. On the other hand, terneplate advanced 24 per cent by volume and 6.6 per cent in value over 1929. Collectively, this made for a decline of 3.6 per cent for 1935 in total output of the two kinds of plate relative to 1929, while the loss in value came to 8.3 per cent.

The Census Bureau reports that the figures given for 1935 are preliminary and subject to revision.



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October Pig Iron Output 2,991,887 Tons

ON the basis of complete returns from companies producing pig iron, actual production of coke pig iron in October was 2,991,887 gross tons, or only 1081 tons less than the estimated total given in last week's issue.

The number of furnaces in blast on Nov. 1, as revised, was 161 compared with 155 active on Oct. 1. In addition to the number of furnaces reported as having been put in blast last week, one Lorain unit of the National Tube Co. and one Harriet furnace of the Wickwire Spencer Steel Co. were blown in. A Campbell furnace of the Youngstown Sheet & Tube Co. was banked. An Otis Steel Co. furnace was erroneously reported as having been blown in. Both

furnaces of this company have been in blast for some time. Also, one Madeline furnace of the Inland Steel Co. was incorrectly reported as having been blown out or banked.

The 161 furnaces operating on Nov. 1 were making iron at the rate of 97,740 tons daily, compared with 155 on Oct. 1, operating at the rate of 94,140 tons daily.

Daily Average Production of Coke Pig Iron

	Gross Tons				
	1936	1935	1934	1933	1932
January	65,351	47,656	39,201	18,348	31,380
February	62,886	57,448	45,131	19,798	33,251
March	65,816	57,098	52,243	17,484	31,201
April	80,125	55,449	57,561	20,787	28,430
May	85,432	55,713	65,900	28,621	25,276
June	86,208	51,750	64,338	42,166	20,935
½ year	74,331	54,138	54,134	24,536	28,412
July	83,686	49,041	39,510	57,821	18,461
August	87,475	56,816	34,012	59,142	17,115
September	91,010	59,216	29,935	50,742	19,753
October	96,512	63,820	30,679	43,754	20,800
November	.....	68,864	31,898	36,174	21,042
December	.....	67,950	33,149	38,131	17,615
Year	.....	67,556	43,592	26,199	23,733

Production of Coke Pig Iron and Ferromanganese

	Gross Tons Pig Iron*		Ferromanganese†	
	1936	1935	1936	1935
January	2,025,885	1,477,336	24,766	10,048
February	1,823,706	1,608,552	24,988	12,288
March	2,040,311	1,770,028	22,725	17,762
April	2,403,683	1,663,475	19,667	18,302
May	2,648,401	1,727,095	18,363	17,541
June	2,586,240	1,552,514	17,549	12,961
½ year	13,528,226	9,799,000	128,058	88,902
July	2,594,268	1,520,263	20,205	13,175
August	2,711,721	1,761,286	20,658	12,735
September	2,730,293	1,776,476	15,919	15,983
October	2,991,887	1,978,411	19,805	19,007
November	.....	2,065,913	.....	18,245
December	.....	2,106,453	.....	17,126
Year	.....	21,007,802	.....	185,173

*These totals do not include charcoal pig iron.

†Included in pig iron figures.

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons)		November 1		October 1	
	October (31 Days)	September (30 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
New York:						
Buffalo	205,758	181,472	12	6,795	11	6,565
Other New York and Mass.	33,068	27,266	3	1,065	3	960
Pennsylvania:						
Lehigh Valley	64,267	55,658	5	2,075	5	1,855
Schuylkill Valley	24,584	23,780	2	795	2	795
Susquehanna and Lebanon Valleys	20,807	18,143	1	670	1	605
Ferromanganese	.....	.....	0	.....	0	.....
Pittsburgh District	686,984	628,256	34	22,255	33	21,870
Ferro. and Spiegel	13,795	14,358	3	445	3	480
Shenango Valley	65,147	57,931	4	2,100	4	2,070
Western Pennsylvania	83,696	78,437	5	3,270	4	2,615
Ferro. and Spiegel	6,010	5,573	1	195	1	185
Maryland	123,913	109,217	5	3,995	5	4,200
Wheeling District	148,204	144,971	6	4,100	7	4,835
Ohio:						
Mahoning Valley	303,525	280,747	14	9,790	14	9,360
Central and Northern	282,315	248,741	15	9,345	14	8,290
Southern	52,454	44,350	4	1,690	4	1,480
Illinois and Indiana	577,786	533,334	25	18,640	25	18,445
Michigan and Minnesota	80,462	79,500	5	2,595	5	2,975
Colorado, Missouri and Utah	27,565	30,289	2	890	2	1,010
The South:						
Virginia	.....	.....	0	.....	0	.....
Ferro. and Spiegel	.....	411	0	.....	0	.....
Kentucky	26,912	25,960	2	870	2	865
Alabama	164,635	140,404	13	6,160	10	4,680
Ferromanganese	.....	.....	0	.....	0	.....
Tennessee	.....	1,495	0	.....	0	.....
Total	2,991,887	2,730,293	161	97,740	155	94,140



..PERSONALS..

FREDERICK E. WARR has been appointed chief of the safety bureau, Pittsburgh district, Carnegie-Illinois Steel Corp. Mr. Warr attended the University of Pittsburgh night school and entered the service of the United States Steel Corp. in 1906 as a clerk at the lower Union mills of the Carnegie Steel Co., at Pittsburgh. In 1914 he was promoted to chief order



F. E. WARR

clerk. From 1920 to 1924 he was foreman of the forge department, and in 1924 was transferred to the McCutcheon mills as assistant to the chief clerk. He was transferred to the safety department, general offices of the Carnegie Steel Co., in 1928 and served as secretary to the general safety committee until his present appointment.

EDWARD W. HILL, superintendent of open-hearth No. 4 at the Homestead steel works of the Carnegie-Illinois Steel Corp., has resigned. Mr. Hill has spent the last 10 or 12 years in this type of work.

DAVID S. YOUNGHOLM has been elected vice-president of the Westinghouse Electric & Mfg. Co. He will be located in New York. Mr. Youngholm joined the Westinghouse organization in 1909 in the engineering department of the Westinghouse Lamp Co., after which he entered the sales department. In 1924 he was placed in charge of production of the Westinghouse Lamp Co., with headquarters at Bloomfield, N. J. A year later he became assistant manager of sales. In 1927 he was

made assistant general superintendent of the company and in 1930 became assistant to the vice-president, later vice-president of the same organization, which position he has held until his present appointment.

THOMAS J. McLOUGHLIN has been appointed assistant to the vice-president in charge of operations of Carnegie-Illinois Steel Corp. Mr. McLoughlin began his career with the United States Steel Corp. as an engineer apprentice at

the Duquesne steel works in 1913. His services have been continuous since that time and from 1924 to January, 1936, he held the position of fuel engineer at the Duquesne works. In January, 1936, he was appointed assistant to the manager of operations for the Pittsburgh district. Mr. McLoughlin was graduated from Stevens Institute of Technology with a degree of mechanical engineer in 1913.

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VARIABLE SPEED TRANSMISSIONS

blast furnaces, Clairton works of Carnegie-Illinois Steel Corp., Pittsburgh, will be transferred to assistant superintendent, blast furnaces, Ohio works. WILLIAM STEWART, assistant superintendent, blast furnaces, Edgar Thomson works, will be transferred to superintendent, blast furnaces, Clairton works. T. G. AYRES, assistant superintendent, Isabella furnaces, will be transferred to assistant superintendent, blast furnaces, Ed-

gar Thomson works. R. URQUHART, superintendent, open hearth No. 3, Homestead works, will be transferred to the assistant superintendency of the entire open-hearth organization at Homestead works. F. R. SMITH, superintendent, open-hearth department, Clairton works, will be transferred to superintendent open-hearth No. 3, Homestead works. W. F. DAVIS, assistant superintendent, open-hearth department, Clairton works,

will be transferred to superintendent, open-hearth department, Clairton works.

♦ ♦ ♦

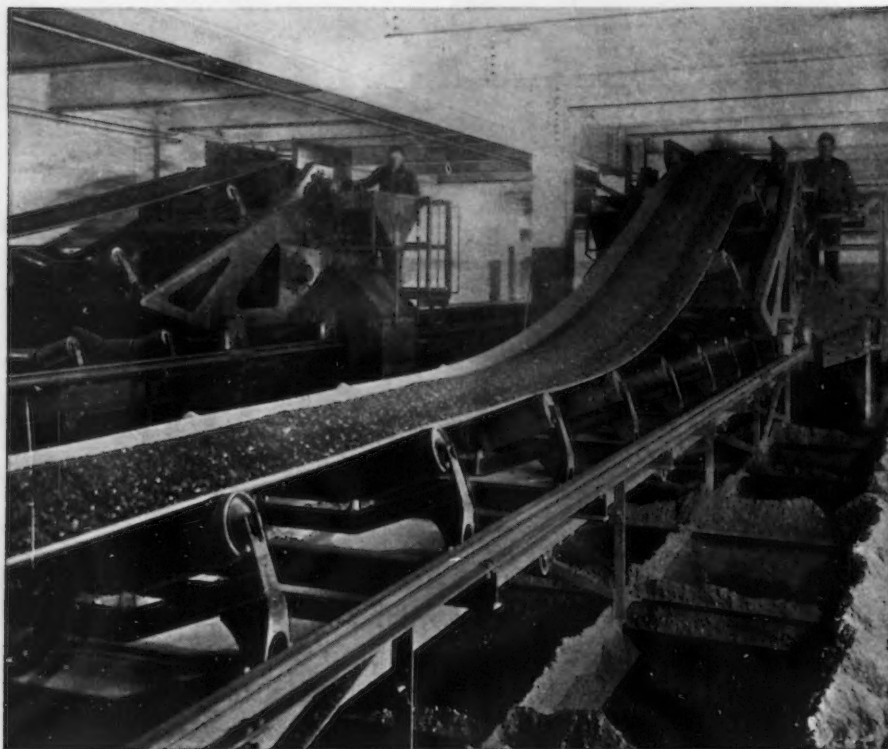
FREDERICK SALDITT, export manager of the Harnischfeger Corp., Milwaukee, has been elected a director and a vice-president, succeeding in the latter post D. B. PATTERSON, who some time ago resigned as a vice-president and sales manager. Mr. Salditt has been associated with the company for 13 years, starting as a clerk in the shop office, working through the engineering, domestic and foreign sales departments until he was appointed export sales manager two and a half years ago.

♦ ♦ ♦

JOHN W. WHITE, former managing director of the Cia. Westinghouse Electric Internacional, S.A., with headquarters at Buenos Aires, Argentina, has been appointed general manager of the Westinghouse Electric International Co.

He attended school at Randolph-Macon and later, while engaged with Westinghouse at its main works at East Pittsburgh, Pa., attended night courses at Carnegie Institute of Technology. He was employed at the East Pittsburgh works of the Westinghouse com-

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- Coal crushers
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- Underfeed screw type stokers

● This modern belt conveyor system, which is used at a large power station for handling and distributing coal to bins, represents the "last word" in low-cost, high-efficiency conveying. Each conveyor has a capacity of 325 long-tons per hour.

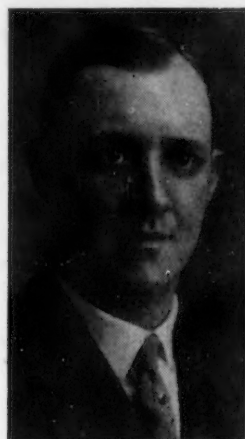
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See our Exhibit at the National Association of Power and Mechanical Engineering, Grand Central Palace, New York, Nov. 30 to Dec. 5



HARRY WILSON, JR.,
works manager, Jes-
sop Steel Co., Washing-
ton, Pa., whose appoint-
ment was announced in
the Oct. 22 issue of THE
IRON AGE.

pany from 1905 until 1912. In 1917 he became manager of the central station and transportation divisions of the Detroit office. The following year he was assigned to Cuba as Westinghouse manager, with headquarters at Havana. He was made managing director of the then Westinghouse Co. of Japan in 1925. In 1931 he was made managing director of the Westinghouse Co., in the Argentine, which position he held until his

present promotion. Mr. White will be located in New York.

♦ ♦ ♦
R. C. ALLEN, executive vice-president, Oglebay, Norton & Co., Cleveland, was unanimously nominated for president and director of the American Institute of Mining and Metallurgical Engineers at a recent meeting of the nominating committee. Mr. Allen served as director of the Institute from 1930 to 1933 and is now its vice-president.

♦ ♦ ♦
E. S. DAVENPORT and R. H. ABORN, research laboratory, United States Steel Corp., Kearny, N. J., will address the New York section



N. W. STORER, whose retirement as consulting railway engineer for the Westinghouse Electric & Mfg. Co. was announced in these columns last week.

of the American Welding Society, Nov. 17, on the "Metallurgical Aspects of Welding Steel."

♦ ♦ ♦
JOHN T. BROWN, works manager of the Chain Belt Co., Milwaukee, has been elected a vice-president of the corporation. Upon his graduation from Yale University in 1925, he entered the Chain Belt plant to take its graduate student training course. He subsequently advanced through various positions to become production manager and more recently to works manager.

♦ ♦ ♦
DEANE S. HOLT, special representative in England of the Harnischfeger Corp., Milwaukee, and chairman of the Newton, Chambers, Harnischfeger Co., Ltd., which handles Harnischfeger excavating equipment sales abroad, is spending some time at the head office in Milwaukee. He is accompanied by W. T. KITCHING, general manager of Newton, Chambers & Co., Ltd., which manufactures Har-

nischfeger excavating equipment for sale abroad.

♦ ♦ ♦
W. W. WILLIAMS, formerly general sales manager of the Babcock & Wilcox Tube Co., Beaver Falls, Pa., has been appointed general manager. T. F. THORNTON, formerly general manager of the Detroit district office, has been made general sales manager.

♦ ♦ ♦
HAROLD BYRON SMITH has been elected president of the Illinois Tool Works, Chicago, succeeding

his father, the late Harold C. Smith. CALMER L. JOHNSON, secretary, has been elected treasurer.

♦ ♦ ♦
B. A. NAGELVOORT, who has been associated since 1932 with the Renown Stove Co., Owosso, Mich., has been appointed general manager, succeeding M. H. PRYOR, who retains his title of vice-president but retires from the active management of the business.

♦ ♦ ♦
DR. GEORGE OTIS SMITH, from 1906 to 1930 director of the United



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PARISH *Specialists in Stampings
of Distinction*

States Geological Survey, will speak on the conservation of natural resources before the fall meeting of the Detroit section, American Institute of Mining and Metallurgical Engineers, on Nov. 16, at the Fort Shelby Hotel.

♦ ♦ ♦
EDWARD R. STETTINIUS, JR., chairman of the finance committee of the United States Steel Corp., has been appointed to the chairmanship of the commerce and industry committee of the United Hospital Campaign Committee.

B. E. SIVYER, JR., for many years in charge of the sales and development of Rex Z-metal for the Chain Belt Co., Milwaukee, has been appointed branch manager of the company's San Francisco office to succeed the late G. E. Taylor. Mr. Sivyver left the University of Wisconsin to enter the war. After returning in 1918, he worked as general superintendent of the Northwestern Malleable Co., and later for the Rockford Malleable Iron Co.

...OBITUARY...

GROVER H. SCHATZ, vice-president and secretary of the Schatz Mfg. Co., and the Federal Bearings Co., Inc., Poughkeepsie, N. Y., and president, Waterbury Steel Ball Co., died of a heart attack Nov. 2.



G. H. SCHATZ

Mr. Schatz was born at New Haven, Conn., Oct. 8, 1888. He came from a family of industrialists and inventors, his father, the late Adolf Schatz having been a manufacturer in New Haven and his grandfather an inventor of a sewing machine and other devices. He entered the Schatz business in 1904, four years after his father and his elder brother Herrman had incorporated the Schatz Hardware Mfg. Co., and had begun the manufacture of ball bearings. He served successively in production, toolmaking, sales and other departments, eventually specializing in production and purchasing.

In his 32 years of activity, Mr. Schatz participated in the extensive growth and expansion of the business. In 1908, the Schatz Mfg. Co. was formed, absorbing the former Schatz company and the Acme ball bearing and sales companies. Two years later the company moved to Poughkeepsie, and in 1915 formed the Federal Bearings Co., an allied organization. In 1928, the Schatz interests acquired the Waterbury Steel Ball Co. Additional plant capacity was provided in 1914, 1916, 1920 and 1926, and recently Mr. Schatz, with his brother, was active in supervising the construction of another plant addition. The various Schatz units

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have employed between 800 and 1100.

Mr. Schatz was active in civic and philanthropic movements, and was a member of several clubs and associations. Surviving him are his wife, two daughters, and his brother, Herrman A. Schatz.

❖ ❖ ❖

ODD J. H. HARTSUFF, former general superintendent of Carnegie-Illinois Steel Corp.'s Edgar Thomson works, died at his home in New Castle, Pa., on Nov. 5, aged 67 years. Mr. Hartsuff retired on Sept. 30, 1933, after 49 years' continuous service in the steel industry. His first job was machinist for the American Steel & Wire Co. at New Castle, and he later was employed by the Carnegie Steel Co. and American Sheet & Tin Plate Co. In March, 1897, he was made rolling mill foreman at the New Castle works of the Carnegie Steel Co. He later was promoted to assistant general superintendent at New Castle and on April 1, 1918, went to the Farrell plant as general superintendent. In 1920 he was made general superintendent of the Edgar Thomson works, Braddock, Pa., which position he held until his retirement in 1933.

❖ ❖ ❖

HENRY B. JOY, one of the founders of the Packard Motor Car Co., died in Detroit on Nov. 6 of heart disease at the age of 72. Around 1900 while searching for a suitable engine for a motor boat, he became acquainted with the Packard brothers in Warren, Ohio, who were then running the Ohio Automobile Co. He invested \$25,000 in the project at the time and later he was instrumental in having the company moved to Detroit in October, 1902, and changing its name to the Packard Motor Car Co. Mr. Joy became chairman of the board and, together with Henry Ford, was one of the men who led the fight against the Selden patents. Aside from his connection with Packard, he was also known in the automotive industry as the man who furthered the Lincoln Highway and who served as the first president of the Lincoln Highway Association. He served his country both in the Navy during the Spanish-American War and in the Army Signal Corps during the World War, from which he retired with the rank of lieutenant-colonel. He resigned his chairmanship at the Packard company to serve in the war. His interest in aviation was directly responsible for Packard getting into the aircraft engine business and he himself acquired the tract of land at Mt. Clemens which is now Selfridge Field of the United States Army.

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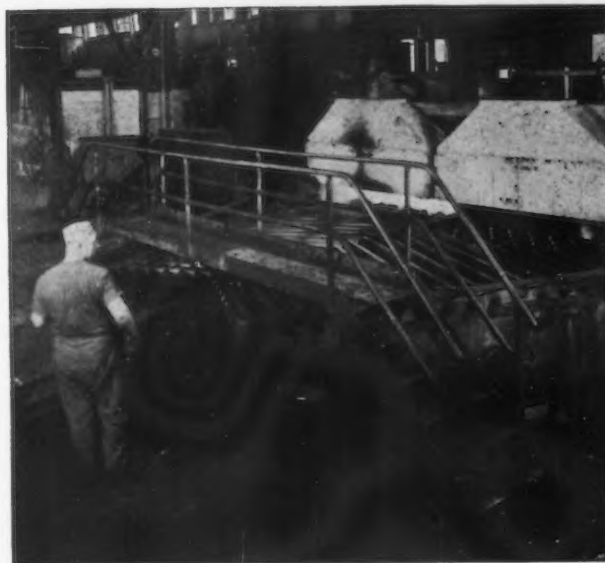
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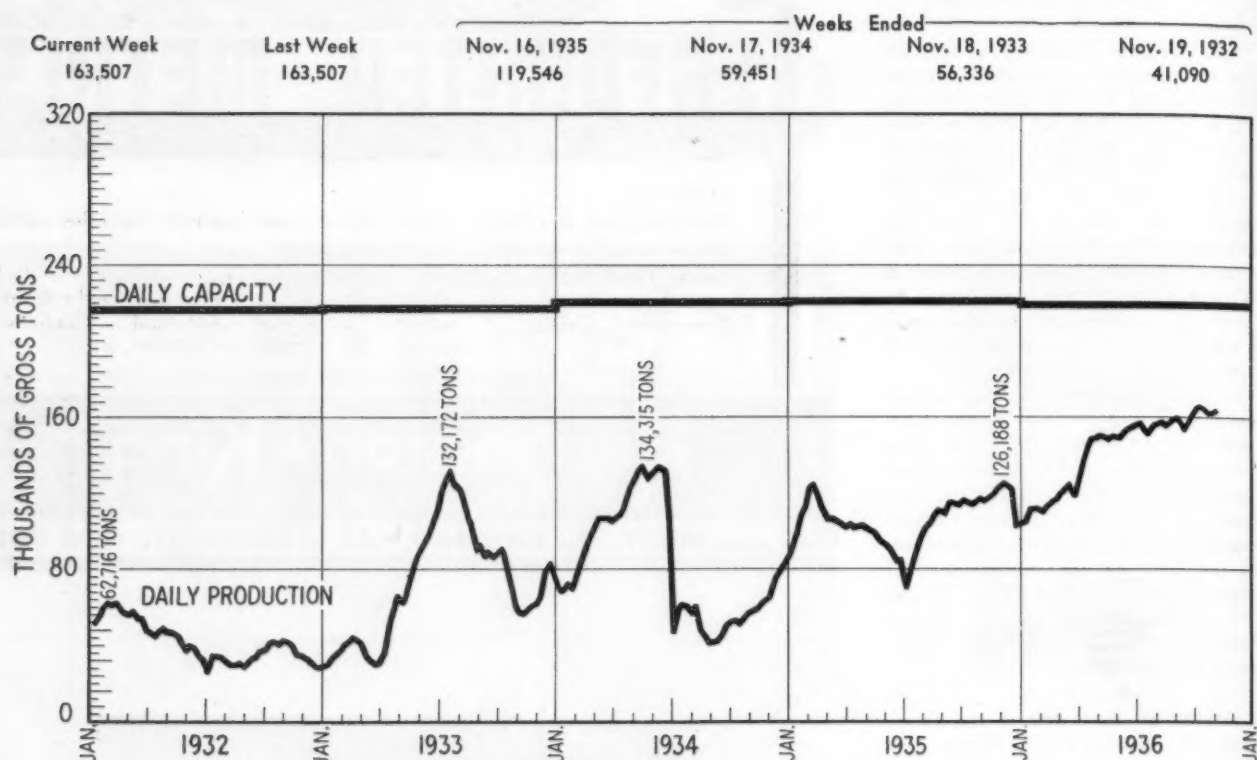
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STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936



Figures for the current week are not indicated on the chart until the following week.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended		
			Oct. 17, 1936	Nov. 16, 1935	Nov. 17, 1934
Pittsburgh	70.0	71.0	76.0	45.0	18.0
Chicago	76.0	76.0	76.0	57.5	31.0
Valleys	75.0	75.0	76.0	58.0	30.0
Philadelphia	55.0	55.5	55.5	40.0	23.0
Cleveland	84.0	84.0	78.0	77.0	32.0
Buffalo	84.0	84.0	78.0	33.0	27.0
Wheeling	93.0	93.0	96.0	83.0	41.0
Southern	69.5	65.0*	60.5	54.0	25.0
Ohio River	95.0	88.0*	95.0	88.0	35.0
Western	59.0	59.0	59.0	35.0	15.0
St. Louis	69.0	69.0*	72.5	55.5	25.0
Detroit	100.0	100.0	95.0	90.0	53.0
Eastern	85.0	90.0	90.0	35.0	25.0
Aggregate	74.5	74.5	75.0	54.0	27.0
Average Year to Date	65.9	65.7*	65.1	47.4	37.8

* Revised.

Weekly Booking of Construction Steel

From THE IRON AGE

	Week Ended				Year to Date	
	Nov. 10, 1936	Nov. 2, 1936	Oct. 13, 1936	Nov. 12, 1935	1936	1935
Fabricated structural steel awards.....	26,000	15,850	14,000	19,230	920,230	677,740
Fabricated plate awards.....	230	1,110	6,415	2,500	191,795	126,955
Steel sheet piling awards.....	1,825	1,875	2,545	0	51,965	57,405
Reinforcing bar awards.....	4,450	2,625	4,300	1,950	298,975	279,150
Total Lettings of Construction Steel...	32,505	21,460	27,260	23,680	1,462,965	1,141,250



...SUMMARY OF THE WEEK...

... Higher prices expected to follow steel wage advances.

• • •

... Steel backlogs being reduced, but operations hold up.

• • •

... Railroad and automotive buying show upward trend.

HIGHER prices for semi-finished and finished steel and pig iron probably will be announced shortly as a sequence of the advances in steel wages, which will add upward of \$60,000,000 annually to the industry's payroll. Although no formal statements have been issued on prices by any of the steel companies, it is believed that quotations for first quarter may be \$2 up for semi-finished steel, bars, shapes and plates and \$3 on light products, excepting tin plate, on which the current price may carry through the 1937 season. Pig iron may be \$1 or \$2 higher.

Official announcements of new prices are likely to be withheld until complete acceptance of the wage offers has been obtained from steel company employees. A fairly large segment of the Carnegie-Illinois workers is dissatisfied with the amount of the increase and the injection of the cost-of-living factor as a basis for future adjustments and further negotiations are in progress. No apprehension is felt in steel circles, however, as to the ultimate result in view of the large number of employees whose representatives have signed the new contract.

STEEL backlogs, except in sheets, are being reduced through an excess of shipments over incoming business, but prospective price advances are counted upon to bring a fresh surge of buying which may load up mill books during December, when ordinarily a seasonal decline occurs. In sheets, however, mills are virtually sold out for the remainder of the year, one Ohio maker having withdrawn from the market.

Minor fluctuations in steel plant operations may occur over the next few weeks, but there are no indications of a sharp decline in production, which

this week remains at substantially last week's level of 74½ per cent. Ingot output in October of 4,545,001 gross tons indicated a rate of 76.7 per cent for the month and was the largest since August, 1929. The 10-months' total was 38,150,305 tons, assuring a 1936 figure of more than 46,000,000 tons, which has been exceeded only three times—in 1926, 1928 and 1929. United States Steel Corp. shipments of 1,007,417 tons in October were the largest since May, 1930, and the 10-months' total of 8,875,124 tons is 47 per cent above the comparable 1935 period.

AS the National Automobile Show opens in New York, the automobile industry swings toward a weekly output of 100,000 units and is taking larger quantities of steel. Sales executives of the industry, who have invariably been precise in their prognostications, are freely predicting a 5,000,000-car year in 1937.

Railroad buying will receive fresh impetus from steel price increases because protection on a "life-of-the-job" basis will be afforded on all equipment purchases currently made. The Union Pacific has awarded 20 locomotives and will buy 45 passenger and dining coaches and rebuild 300 automobile cars; the Western Maryland will buy 100 to 500 box cars and 100 gondolas; the Western Pacific is inquiring for 200 box cars; the Chicago & Eastern Illinois has obtained permission to purchase 500 box cars; the Virginian will repair 500 gondola cars; the St. Louis-Southwestern will repair 100 cars, and the Utah Copper Co. has ordered 12 electric locomotives. Rail orders are also coming out in larger volume in advance of the withdrawal of the present price Dec. 1. Following distribution of 48,500 tons by the Chicago & North Western, two other Western roads have bought a total of 35,000 tons and inquiries for 130,000 tons are pending at Chicago, while in the East an order may be placed for 50,000 tons.

Meanwhile, lettings of structural steel have gained after several weeks of hesitation, this week's total of 26,000 tons including 6500 tons for the Sixth Avenue subway, New York. Private building activity is making further headway.

Contrasting with favorable indications in most branches of the industry, steel scrap has shown further weakness, with declines at Pittsburgh and Philadelphia, resulting in a reduction of 25c. in THE IRON AGE composite price to \$16.33.



...PITTSBURGH...

... Price increases of \$2 to \$3 a ton may be announced shortly.

o o o

... Steel backlogs reduced, but new buying would follow higher quotations.

o o o

... Private construction work is showing gain; steel scrap off 25c.

PITTSBURGH, Nov. 10.—Interest this week is centered on the question of higher prices for steel products during the first quarter of 1937. It is the opinion of most producers in this district that price changes of \$2 to \$3 a ton are in prospect. There is also a possibility that, if and when price announcements are made, they will be effective immediately, which would preclude any large amount of anticipatory bookings being placed at present prices.

Meanwhile, steel ingot output in the Pittsburgh district has eased off one point to 70 per cent of capacity, while production in the Wheeling district remains unchanged at 93 per cent. Aggregate demand for steel products has shown little change from a week ago. Bookings of heavy plates and shapes are not any stronger, but have fallen so low that their effect on future operations can be discounted.

There is no evidence of any drastic decline in the operating rate in this district, and when price increases are announced, producers expect a much better flow of orders. While backlogs on hot-rolled and cold-finished bars have eased off some during the past several weeks, unfilled orders on sheets have shown no change from the amount existing around the first of October. Main impetus in sheet orders is coming from the automobile manufacturers, but a substantial volume of bookings is also being received from miscellaneous sources. Demand for tin plate is lighter, but backlogs support the present operating rate of 93 per cent.

An optimistic feature of the heavy materials market is the continuation of a better ratio between private and publicly financed projects, the former having shown a gratifying increase in the past several weeks. The Mesta Machine Co., Pittsburgh, will require 550 tons of material for an annealing building and 250 tons for a new steel floor in the forge shop, both awards having gone to Bethlehem Steel Co. Fort Pitt Bridge Works will fabricate 1300 tons of plates and shapes to be used in the construction of an extension to a shop building of the Electro-Motive Corp., McCook, Ill.

The raw material markets remain quiet with the exception of No. 1 heavy melting scrap, which has declined 25c., although the market still shows a strong undertone.

Production and movement of pig iron to the merchant trade is at virtual capacity and a price increase is expected within the near future.

Pig Iron

As yet no price increase announcements have been made by any producers in this district, although higher quotations are expected for first quarter delivery. Some steel mills catering to merchant trade are turning down orders for steel making iron, as they need all they can produce for their own requirements. While merchant iron is still obtainable, large contracts and heavy consumption have been such as to tax production facilities for this type of iron over the next few months.

Semi-Finished Steel

Demand has picked up in the past week and is likely to grow as the time nears for the probable announcement of higher prices. Third quarter priced orders are about completed. Stocks at non-integrated plants are not plentiful and this week's improvement in buying indicates heavy consumption. Owing to their own requirements, many large steel producers only accepted a volume of orders which they knew they could ship during October.

Bolts, Nuts and Rivets

New business is being received in satisfactory volume. Main interests specifying are automobile manufacturers and railroads. The latter are taking fair tonnages of material to round out repair programs. Miscellaneous demand is holding up well with orders emanating from widely diversified sources. Now that automobile production is steadily gaining, producers expect heavier releases from this source over the remainder of the year. In view of the almost certain increase in steel prices for the first quarter of 1937, there is good reason to believe that bolt and nut prices will advance.

Bars

Bookings in the past week were on a par with the week before, but are above the rate during the first two weeks of October. Producers' backlogs have been reduced to some extent, but some customers are still exerting pressure for better deliveries. Since it is probable that higher prices for the first quarter will be announced within the near future, it is expected that a heavy influx of bookings will be received before present backlogs are materially reduced. Substantial releases from automotive manufacturers are being received and a steady volume of tonnage is going to farm implement manufacturers. Increased automobile production has resulted in an improvement in alloy steel bookings.

Cold-Finished Bars

Mill backlogs have been reduced some during the past few weeks, but deliveries still range from five to seven weeks. New business is holding up well, but in aggregate tonnage does not approximate shipments. Good releases are being received from automobile manufacturers and shipments to farm implement and electrical appliance makers continue in good volume. There is no evidence of any stocking up on the part of customers. Producers expect a heavy volume of bookings before the end of the

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 10, 1936	Nov. 2, 1936	Oct. 13, 1936	Nov. 12, 1935
Rails, heavy, at mill	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	32.00	32.00	32.00	27.00
Sheet bars, Pittsburgh	32.00	32.00	32.00	28.00
Slabs, Pittsburgh	32.00	32.00	32.00	27.00
Forging billets, Pittsburgh	39.00	39.00	39.00	35.00
Wire rods, Nos. 4 and 5, P'gh	40.00	40.00	40.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.70

Pig Iron

Per Gross Ton:	Nov. 10, 1936	Nov. 2, 1936	Oct. 13, 1936	Nov. 12, 1935
No. 2 fdy., Philadelphia	\$21.3132	\$21.3132	\$21.3132	\$21.3132
No. 2, Valley furnace	19.50	19.50	19.50	19.50
No. 2, Southern Cln'tl.	19.44	19.44	19.44	20.2007
No. 2, Birmingham	15.88	15.88	15.88	14.50
No. 2, foundry, Chicago*	19.50	19.50	19.50	19.50
Basic, del'd eastern Pa.	20.8132	20.8132	20.8132	20.8132
Basic, Valley furnace	19.00	19.00	19.00	19.00
Malleable, Chicago*	19.50	19.50	19.50	19.50
Malleable, Valley	19.50	19.50	19.50	19.50
L. S. charcoal, Chicago	25.7518	25.7518	25.7518	25.2528
Ferromanganese, seab'd car-lots	75.00	75.00	75.00	85.00

*This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.05	2.05	2.05	1.85
Bars, Chicago	2.10	2.10	2.10	1.90
Bars, Cleveland	2.10	2.10	2.10	1.90
Bars, New York	2.40	2.40	2.40	2.20
Plates, Pittsburgh	1.90	1.90	1.90	1.80
Plates, Chicago	1.95	1.95	1.95	1.85
Plates, New York	2.19	2.19	2.19	2.09
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.80
Structural shapes, Chicago	1.95	1.95	1.95	1.85
Structural shapes, New York	2.16 1/4	2.16 1/4	2.16 1/4	2.06 1/4
Cold-finished bars, Pittsburgh	2.35	2.35	2.35	1.95
Hot-rolled strips, Pittsburgh	1.95	1.95	1.95	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.60	2.60	2.60	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.70	2.70	2.70	2.50
Sheets, galv., No. 24, P'gh	3.20	3.20	3.20	3.10
Sheets, galv., No. 24, Gary	3.30	3.30	3.30	3.20
Hot-rolled sheets, No. 10, Pittsburgh	1.95	1.95	1.95	1.85
Hot-rolled sheets, No. 10, Gary	2.05	2.05	2.05	1.95
Cold-rolled sheets, No. 20, Pittsburgh	3.05	3.05	3.05	2.95
Cold-rolled sheets, No. 20, Gary	3.15	3.15	3.15	3.05
Wire nails, Pittsburgh	2.05	2.05	2.05	2.40
Wire nails, Chicago dist. mill	2.10	2.10	2.10	2.45
Plain wire, Pittsburgh	2.50	2.50	2.50	2.30
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.35
Barbed wire, galv., Pittsburgh	2.55	2.55	2.55	2.80
Barbed wire, galv., Chicago dist. mill	2.60	2.60	2.60	2.85
Tin plate, 100 lb. box, P'gh	\$5.25	\$5.25	\$5.25	\$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at time a range of prices on various products, as shown in our detailed price table.

Scrap

Per Gross Ton:	\$17.25	\$17.50	\$18.00	\$13.50
Heavy melting steel, P'gh	\$17.25	\$17.50	\$18.00	\$13.50
Heavy melting steel, Phila.	15.25	15.75	15.75	12.00
Heavy melting steel, Ch'go	16.50	16.50	16.25	12.75
Carwheels, Chicago	16.50	16.50	16.50	12.75
Carwheels, Philadelphia	16.75	16.75	16.75	12.75
No. 1 cast, Pittsburgh	16.25	16.25	16.25	14.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	12.75
No. 1 cast, Ch'go, (net ton)	14.00	14.00	14.00	11.25
No. 1 RR, wrot., Phila.	15.75	15.75	15.75	12.25
No. 1 RR, wrot., Ch'go (net)	14.25	14.25	14.25	9.50

Coke, Connellsville

Per Net Ton at Oven:	\$3.75	\$3.75	\$3.75	\$3.60
Furnace coke, prompt	\$3.75	\$3.75	\$3.75	\$3.60
Foundry coke, prompt	4.25	4.25	4.25	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	10.50	10.00	9.75	9.00
Lake copper, New York	10.62 1/2	10.12 1/2	9.87 1/2	9.37 1/2
Tin (Straits), New York	54.00	45.87 1/2	44.62 1/2	53.62 1/2
Zinc, East St. Louis	4.95	4.85	4.85	4.90
Zinc, New York	5.32 1/2	5.22 1/2	5.22 1/2	5.27 1/2
Lead, St. Louis	4.95	4.65	4.45	4.35
Lead, New York	5.10	4.80	4.60	4.50
Antimony (Asiatic), N. Y.	12.50	12.50	12.50	15.50

The Iron Age Composite Prices

Finished Steel

Nov. 10, 1936	2.197c. a Lb.
One week ago	2.197c.
One month ago	2.197c.
One year ago	2.130c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

	HIGH	LOW
1936	2.197c., Sept. 29	2.084c., Mar 10
1935	2.130c., Oct. 1	2.124c., Jan. 8
1934	2.199c., April 24	2.008c., Jan. 2
1933	2.015c., Oct. 3	1.867c., April 18
1932	1.977c., Oct. 4	1.926c., Feb. 2
1931	2.037c., Jan. 13	1.945c., Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29
1928	2.286c., Dec. 11	2.217c., July 17
1927	2.402c., Jan. 4	2.212c., Nov. 1

Pig Iron

\$18.73 a Gross Ton
18.73
18.73
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	HIGH	LOW
1936	18.84, Jan. 7	18.73, Aug. 11
1935	18.84, Nov. 5	17.83, May 14
1934	17.90, May 1	16.90, Jan. 27
1933	16.90, Dec. 5	13.56, Jan. 3
1932	14.81, Jan. 5	13.56, Dec. 6
1931	15.90, Jan. 6	14.79, Dec. 15
1930	18.21, Jan. 7	15.90, Dec. 16
1929	18.71, May 14	18.21, Dec. 17
1928	18.59, Nov. 27	17.04, July 24
1927	19.71, Jan. 4	17.54, Nov. 1

Steel Scrap

\$16.33 a Gross Ton
16.58
16.67
12.75

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1936	\$16.75, Sept. 22	\$12.67, June 9
1935	13.42, Dec. 10	10.33, April 23
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.43, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.58, Jan. 29	14.08, Dec. 3
1928	16.50, Dec. 31	13.08, July 2
1927	15.25, Jan. 11	13.08, Nov. 22

year in case the probable increase in prices for first quarter delivery materializes.

Shapes and Plates

Demand for heavy plates and shapes has shown no change from a week ago and still remains light compared with bookings of other steel products. Meanwhile, the influence of these products on operations is about discounted as it is not probable that the aggregate demand will fall below the present level. Bethlehem Steel Co. is furnishing 550 tons of material for an annealing building and 250 tons for a new floor in the forge shop of Mesta Machine Co., Pittsburgh. The Fort Pitt Bridge Works received the contract for 1300 tons of material to be used in the construction of an extension to the shop building of the Electro-Motive Corp., McCook, Ill. Another privately financed project involves 680 tons for new buildings for the Armstrong Cork Co., Lancaster, Pa., and will be furnished by American Bridge Co. Notable in recent inquiries and awards is the increased number of privately financed building projects.

Reinforcing Steel

Frankfort Distilleries, Louisville, Ky., will require 800 tons of reinforcing steel for three buildings, two of which will be constructed at Baltimore and one at Louisville. While no large individual projects are in the offing, quite a number of jobs requiring less than 100 tons have been received over the past few weeks.

Strip

Specifications for hot and cold-rolled strip steel continue to flow in freely. While automobile manufacturers are taking large tonnages, the steady flow of orders from miscellaneous sources has shown no tendency to decrease. Cash register manufacturers are specifying freely, as are makers of various household appliances. In view of the distinct possibility of higher prices of strip for first quarter delivery, producers expect an upward surge in new business before the end of the year.

Tin Plate

New bookings have eased off but backlogs are sufficient to maintain operations around 93 per cent. Aggregate tonnages comprise a good volume of specifications from general line can manufacturers and a fair portion is represented by 1937 packers' requirements.

Steel Sheet Piling

Bethlehem Steel Co. will fabricate 875 tons of steel piling for the

Conchas dam at New Kirk, N. M. The Jones & Laughlin Steel Corp. has received an award of 650 tons of piling to be used in the construction of sewers at Haverhill, Mass. The U. S. Engineers' Office at Vicksburg, Miss., will take bids Dec. 3 on 1203 tons of piling for the construction of a concrete steel sheet pile levee wall at Monroe, La. U. S. Engineers' Office at Philadelphia will take bids Nov. 13 on 1450 tons of piling to be used in the construction of jetties on the Broadkill River, Rehoboth Bay, Dela.

Tubular Products

Orders for tubular products are coming in at a steady rate. Owing to seasonal movement and to the increase in building activity, improvement in the bookings of standard pipe continues. While no large line pipe orders are in prospect, fair tonnages involving individually small orders are being received. There has been no change in the steady booking of oil-country goods.

Wire Products

Producers are experiencing a satisfactory volume of manufacturers' wire specifications at the new prices. While a large portion of these tonnages is for automobile manufacturers, miscellaneous sources are specifying quite freely. Sufficient sales at the new prices have been made to test present quotations adequately. While fresh demand for merchant wire products has not kept pace with the improvement in bookings of manufacturers' wire, orders received have been beyond the expectations of producers, in view of the heavy buying during the latter part of September. An increase in prices for the first quarter, which is considered probable, would undoubtedly drive in new business before the end of the year.

Coal and Coke

Last minute rush in coal shipments before the closing of the Lake season is now in progress. Meanwhile, local domestic demand has fallen off, owing to stocking up by customers before price increases materialized. Large industrial plants still continue to stock as much coal as possible in anticipation of possible labor disturbances and winter weather. The coke market remains quiet as far as new inquiries and demand are concerned. Producers are actively engaged in beehive coke production on blast furnace contracts. Inquiries for domestic size coke have dropped off recently because of unseasonably mild weather. This trend, producers feel, will be re-

versed as soon as winter weather sets in.

Sheets

Volume of specifications shows little change from a week ago. Automobile manufacturers figure heavily in the aggregate tonnages being ordered. Substantial amounts of material have been taken by car roofing manufacturers, who have been extremely busy on account of railroad rehabilitation programs. While backlogs have eased off slightly, they still run from five to seven weeks. Should a price increase materialize, it would be impossible for many customers to cover all their needs in order to escape the rise, since practically all sheet mills in the country are booked almost to the end of the year.



... **Steel mill operations being stepped up.**

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... **Some departments are running at capacity.**

TORONTO, Ont., Nov. 10.—Demand for steel products in the Canadian markets continues to expand, while at the same time Canadian steel interests state that export sales are increasing. Dominion Steel & Coal Corp., Sydney, N. S., is planning to step up operations to at least 70 per cent, while Steel Co. of Canada, Ltd., Hamilton, Ont., is running at capacity in some departments, with the plant averaging about 80 per cent.

Demand for pig iron is holding at a high rate, with weekly sales exceeding 1200 tons. Melters are entering the market at frequent intervals for iron for immediate needs and orders for lots up to 300 tons are fairly numerous. Current demand is almost entirely for spot delivery. Pig iron production is holding better than 50 per cent of all Canadian blast furnace capacity, with five furnaces blowing. Imports continue small, with odd lot shipments arriving from Great Britain, but the greater part coming from the United States. Prices are firm and unchanged.

A strong demand exists for iron and steel scrap. There is a good tonnage of automobile scrap available in the local market for export to the United States. Prices are firm and unchanged.



CHICAGO

... Rail tonnage being placed with mills in larger volume.

° ° °

... Steel buyers concerned as to amount of probable price advances.

° ° °

... Except for structural steel, current business is satisfactory.

CHICAGO, Nov. 10.—Ingot production has dropped a shade under the 76 per cent of capacity, but specifications and new buying of finished steel point to no recession other than the ordinary variation which occurs from week to week.

Rail business is starting to flow in volume and orders are being taken for shipment at mill convenience up to the end of March. This tonnage will prove useful if needed to iron out production irregularities should they occur during the winter months.

The matter of prices for all iron and steel products is once again to the fore. The opinion is frequently heard that wage advances and other higher costs more than offset the new price levels established at the beginning of this quarter. Accordingly, there is much discussion on the part of all concerned, not as to the possibility of price advances, but as to how much will be added to present levels. Buyers are paying close attention to developments, especially those who now have in their possession long-term contracts for their products.

Some steel mill products, such as flat rolled, are already sold out for the remainder of this year and the disposition is in such cases not to burden books with additional tonnages which would necessitate January deliveries at prices under those which may prevail for the first quarter period.

The structural picture is not improved, though mills are still enjoying satisfactory specifications against old awards.

The scrap market is without special feature except for speculation in cast iron wheels, which dealers feel will be in large demand for

their part in the expected 1937 railroad equipment program.

Pig Iron

Shipments are shooting to a new high of the year and buying is again beginning to spurt. Pig iron producers are saying little about higher prices, but users are well acquainted with the rising costs of production and they are beginning to anticipate higher quotations, not necessarily for first quarter but at some date before the end of the year.

Rails

Announcement by the Chicago & North Western that it had distributed 48,500 tons of rails among Carnegie-Illinois, Inland and Bethlehem is now followed by orders from two other railroads for a total of 35,000 tons. Undisclosed inquiries which are before mills total over 130,000 tons. The North Western has distributed 14,000 tons of track accessories. Other railroads which have made recent purchases of rails are negotiating for track supplies. Current orders are being taken for shipment at the convenience of mills up to March 31 of next year.

Bars

Bar mills are being hard pressed for deliveries as most consumers hold to steady requirements and automobile manufacturers continue their march to higher production schedules. All reports point to a still higher rate of automobile production, and sellers of bar mill products look for measurably higher demand from that source. Makers of cold-drawn bars are operating at capacity and specifications issued by machinery manufacturers indicate that they have

reached plant capacity. Forgers in this area are well engaged and they expect to experience heavier pressure from automobile plants. The use of steel by the farm equipment industry is steady except where handicapped by labor troubles such as now exist at the Racine, Wis., plant of the J. I. Case Co.

Plates

The Department of Water Power of Los Angeles has placed 1725 tons of plates with two Western fabricators. Local plate shops are still obtaining a fair run of miscellaneous business, but most heavy tonnage orders are being placed to the east of Chicago. The outlook for railroad equipment orders is still very promising. Increased steel wages may readily result in higher prices for first quarter steel deliveries and, with this step in the wind, many railroads may push forward car programs which have already been put in good shape. Railroad car shops continue the heavy repair programs which have now been in force for the past few months.

Cast Iron Pipe

Business has been slow as a result of officeholders' interest in election matters. It can be expected that the flow of orders will start again in December, which is the month when large winter business starts to develop. The trade is optimistic in its views as to 1937. It feels that the coming year will approach normal.

Reinforcing Bars

As most tonnages are public in character and because the attention of officials has been centered on the election, reinforcing bar awards have suffered. The week's awards are extremely light, consisting mainly of orders of less than 100 tons each, many of them for a few hundred pounds. Shop backlogs are falling back slowly but they are still far from a danger point. Inquiries are large in the aggregate, however, and the outlook is that shop operations will remain at a good level throughout the winter. Prices are spotty on the larger tonnages.

Structural Material

Outstanding among awards in Chicago is the 1500 tons for the Museum of Science and Industry. All other local business is small and of insufficient volume to keep shop backlogs from slipping to lower levels. Three new attractive private undertakings have been holding the attention of the trade. One of these is the 1450-ton addition to the Electro-Motive Corp. plant at McCook, Ill. An-

other is a 2000-ton chemical plant in Tennessee and a third is a paper mill in South Carolina. Large inquiries consist of two bridges calling for 2450 tons.

Wire Products

Mills are operating at 70 per cent of capacity and pressure continues to pile up as automobile plants make greater use of wire and wire products. General manufacturing lines are steady, but producers are concerned over the slowness of barbed wire and nails. Demand is good for magnet wire and the lighter electrical wires as used by the utilities. Heavy cable construction work is scarce, and this is reflected at wire mills.

Sheets

Books for most sheet mill products are now filled for the year and producers are watching developments closely because there is the feeling that with wages going up production costs will force higher prices, and there is the desire to take full advantage of such a rise at the opening of the first quarter. Therefore, orders that would spill deliveries over the Jan. 1 line are not attractive.



Vicksburg, Miss., has secured Federal loan and grant for \$300,000 for welded steel pipe line from Jackson, Miss., gas field to Vicksburg city limits, about 36 miles, for natural gas transmission and distribution. Bond issue for \$165,000 of sum noted has been approved. H. L. Miller, Vicksburg, is engineer.

Plant City, Fla., has let contract to I. H. Smith Co., Barnett Building, Jacksonville, Fla., for steel pipe gas system, including gas plant. Fund of \$100,000 has been secured through Federal aid.

Southern Nebraska Natural Gas Co., Holbrook, Neb., plans welded steel pipe line from main trunk line to town limits at Beaver City, Arapahoe and Oxford, Neb., about 15 miles, for natural gas transmission. Franchises have been secured and steel pipe line distribution systems will be installed, including distributing and control stations. Entire project will cost over \$175,000.

Northwest Independent Natural Gas Producers Association, Great Falls, Mont., E. B. Coolidge, president, is negotiating for Federal loan and grant for welded steel pipe line system for natural gas transmission from oil field district at Cut Bank, Mont., to Minneapolis, St. Paul and Duluth, Minn., and vicinity, comprising 400 miles of 20-in. steel pipe from Cut Bank to Baker, Mont., gas field, where connection will be made with 18-in. pipe line from Garland, Wyo., gas field district, 235 miles, with steel pipe line gathering systems in three gas fields noted. From Baker, a 24-in. pipe line will be built to Brainerd, Minn., 465 miles, and from that point, 24-in. line to Minneapolis and St. Paul, 95 miles, and an 18-in. line to Duluth, 155 miles. Entire project will cost over \$45,000,000 with booster stations at different points, and distribution and control plants at municipalities noted.

October Output of Steel Ingots Establishes Seven-Year Record

A SEVEN-YEAR peak in output of bessemer and open-hearth steel ingots was established last month when the domestic production, totaling 4,545,001 gross tons, not only rose above all previous months this year but surpassed every monthly record since August, 1929. As calculated by the American Iron and Steel Institute, the October volume this year rose 383,893 tons over September and 1,402,242 tons over October, 1935, an increase of about 9 per cent and 45 per cent respectively. Only in October, 1928, and from March through August of 1929 was the monthly ingot output larger than last month. The all-time record output was 5,286,246 gross tons, established in May, 1929.

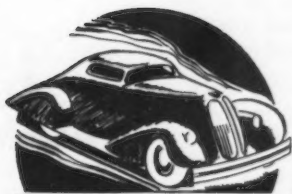
Daily production for the period amounted to 168,333 gross tons as against 160,043 tons in September and 116,398 tons in the corresponding month of 1935. This was a

higher daily average than for any month since September, 1929, when 181,115 tons a day was produced. The industry accordingly operated during October this year at 76.70 per cent of capacity, a substantially higher rate than was indicated by the aggregate weekly estimates of either THE IRON AGE or the American Iron and Steel Institute. The operating figure compares with a rate of 72.92 per cent in September and 52.58 per cent in October, 1935.

Having averaged better than 66 per cent of capacity during the first 10 months this year, the industry's production by the end of October amounted to 38,150,305 gross tons. This figure exceeds the 1935 full-year output by more than 4,700,000 tons, and, with two months remaining, forecasts a final tally on this year's production of about 47,000,000 tons in round numbers.

REPORTED BY COMPANIES WHICH IN 1934 MADE 97.91 PER CENT OF THE OPEN-HEARTH AND 100 PER CENT OF THE BESSEMER INGOT PRODUCTION

	Reported Production (Gross Tons)		Calculated Monthly Production All Companies		Number of Working Days	Per Cent of Opera- tion
	Open-Hearth	Bessemer	Monthly	Daily		
1934						
January	1,786,458	172,489	1,997,129	73,968	27	33.59
February	1,993,465	175,873	2,211,944	92,164	24	41.86
March	2,540,243	203,904	2,798,440	103,646	27	47.07
April	2,622,531	257,482	2,936,064	117,443	25	53.34
May	3,003,676	331,620	3,399,494	125,907	27	57.18
June	2,718,782	282,592	3,059,483	117,672	26	53.44
July	1,340,924	119,869	1,489,453	59,578	25	27.06
August	1,245,139	109,598	1,381,350	51,161	27	23.24
September	1,127,269	117,615	1,268,977	50,759	25	23.05
October	1,325,777	127,789	1,481,902	54,885	27	24.93
November	1,447,626	132,059	1,610,625	61,947	26	28.13
December	1,794,437	131,467	1,964,257	78,570	25	35.68
Total	22,946,327	2,162,357	25,599,118	83,312	311	37.38
1935						
January	2,578,531	239,858	2,870,161	106,302	27	48.02
February	2,499,744	224,336	2,774,271	115,595	24	52.22
March	2,582,628	230,810	2,865,292	110,204	26	49.78
April	2,361,275	231,916	2,640,602	101,562	26	45.88
May	2,332,042	254,796	2,633,661	97,543	27	44.06
June	2,007,862	210,487	2,258,664	90,347	25	40.81
July	2,003,151	224,456	2,267,827	87,224	26	39.40
August	2,629,768	233,361	2,915,930	107,997	27	48.78
September	2,540,264	233,737	2,825,004	113,000	25	51.04
October	2,815,510	270,719	3,142,759	116,398	27	52.58
November	2,841,199	252,163	3,150,409	121,170	26	54.73
December	2,789,015	228,392	3,073,405	122,936	25	55.53
Total	29,980,989	2,835,031	33,417,985	107,453	311	48.54
1936						
January	2,793,421	196,389	3,045,946	112,813	27	51.40
February	2,707,562	202,445	2,964,418	118,577	25	54.03
March	3,095,375	185,040	3,342,619	128,562	26	58.58
April	3,565,821	304,775	3,942,254	151,625	26	69.09
May	3,670,401	302,092	4,046,253	155,625	26	70.91
June	3,578,044	334,897	3,984,845	153,263	26	69.83
July	3,525,281	326,606	3,922,731	150,874	26	68.74
August	3,768,832	350,560	4,195,130	161,351	26	73.52
September	3,782,056	303,048	4,161,108	160,043	26	72.92
October	4,144,013	317,710	4,545,001	168,333	27	76.70



... CLEVELAND ...

... Higher steel and pig iron prices expected for first quarter.

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... Increases may be \$2 on heavy products and \$3 on light.

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... Heavy volume of forward buying looked for as a result.

CLEVELAND, Nov. 10. — Higher prices for finished steel for the first quarter are considered certain because of the general wage advance in the steel industry. Many inquiries from consumers as to the amount of the advance have already reached sales offices of the steel companies. Some predictions are that there will be an advance of \$2 a ton on bars, plates and shapes and \$3 on sheet and strip steel. Advances of these amounts, it is claimed, are fully justified by the increased cost caused by the advance in wages. Prices for the first quarter are expected to be announced about Nov. 21.

Ingot output is unchanged this week at 84 per cent of capacity in the Cleveland-Lorain district and 75 per cent in the Youngstown district. The volume of business in finished steel so far this month has been about the same as during the corresponding period of October. New orders for sheets and strip steel in large lots came during the week from the motor car industry and, with the increase in production schedules, the demand from this source is expected to continue to expand for several weeks.

A heavy volume of forward buying is looked for in anticipation of advances in prices. Buying of rails and railroad equipment is expected to be stimulated. Railroads with headquarters here have purchased little steel for several months. New impetus, it is believed, will be given to private construction work in the building field. Sheet and cold strip mills have little tonnage to offer during the remainder of the year, and it will not take much increase in business for mills to become filled up with all the steel in most other products

that they can produce before January 1.

The maritime strike is interfering with rail-water shipments of finished steel from Ohio mills to the Pacific Coast and Gulf ports. Some steel shipped by rail to Baltimore for transshipment by water to destination has been held up awaiting shipping instructions from customers. In some cases buyers are having the steel shipped all-rail to designation, having agreed to assume the additional transportation costs.

Bars, Plates and Shapes

Bars are in good demand, the tonnage being well divided between miscellaneous consumers and the requirements of motor car manufacturers. Mills have fair backlogs but generally can make shipments in two or three weeks. Inquiry in the construction field is light, but it is likely to be stimulated by the expected price advance on structural shapes. Considerable tonnage is in prospect in grade crossing elimination work.

Pig Iron

With most consumers under contract, sales have tapered, although one producer booked a number of orders during the week for lots up to 1000 tons. Shipments so far this month show a gain over October. One leading Lake furnace interest reports that its shipments so far this month are 10 per cent greater than in the corresponding period last month. Larger tonnages are being released by automotive foundries. With a price advance generally expected, many foundries have purchased more iron than they will need during the current quarter and some are believed to have bought enough to last them through half of the first quarter.

Sheets

With the placing of additional orders for substantial tonnages, new business from the motor car industry showed a further gain the past week. Refrigerator manufacturers are getting under production on new models and are ordering freely. Demand is also good from stove manufacturers, some of whom have enough business on their books to indicate that they will be very busy for the next few months. Enameling sheets are in good demand from the refrigerator, stove and sign manufacturers. With orders and reservations, sheet mills are well filled for the remainder of the year. One Ohio producer has announced that it could take no more sheets for delivery this year except hot-rolled material and has turned down business in other grades. Another Ohio manufacturer has virtually withdrawn from the market except for enameling sheets and stock sizes.

Strip Steel

New orders for hot and cold-rolled strip in sizable lots were placed during the week by some of the automobile parts plants of motor car builders. These parts plants are stepping up production. Other consumers in the motor car field are ordering freely. Deliveries are fair on hot strip ranging from two to three weeks, but makers of cold strip are not catching up on shipments. Mills generally are not promising deliveries within six weeks.

Bolts and Nuts

Releases for sizable lots of bolts and nuts are coming from the motor car industry and the demand is good from miscellaneous consumers, including railroads. The industry is operating at about 60 per cent of capacity. Production in the small bolt departments is close to capacity, but the total percentage of operations is cut considerably by the slack demand for heavy bolts.

Republic Bond Issue To Provide New Mill

CLEVELAND, Nov. 10.—Plans for the construction of a wide continuous strip mill by Republic Steel Corp., Cleveland, at its Corrigan-McKinney plant are expected to be announced shortly. For building this mill and other improvements and expansions, funds will be provided from the proceeds of \$25,000,000, 20-year, 4½ per cent general mortgage bonds which are being offered this week by an underwriting group of bankers.



..SAN FRANCISCO..

... Maritime strike has not seriously affected steel business.

o o o

... Structural steel and reinforcing bar awards turn upward.

SAN FRANCISCO, Nov. 9.—In spite of prevailing strike conditions on the Pacific Coast, activity in the steel market last week was slightly above that of the preceding few weeks. Though some shipments have been held up through the dock crisis, there seems little likelihood that activity in steel plants and warehouses will be affected directly for several weeks. Steel workers are not organized and have shown no great desire to join the predicted general strike. A 10 per cent wage increase, effective last week in all the major Pacific Coast companies, further lessens the danger of a walkout.

Structural steel awards reached an aggregate total of 3318 tons, a sum greater than in any of the past six weeks. No outstanding jobs were awarded, but a number of small projects swelled the total greatly. Awards in the reinforcing bar market totaled 3927 tons, with 300 and 400-ton jobs predominating. The East Bay Utilities District of Oakland, Cal., awarded 1200 tons of 4, 6, 8, and 16-in. cast iron pipe for a proposed water project to U. S. Pipe & Foundry Co.

Though immediate proposed projects were few and small, several large tentative jobs were announced. The Dalles, Ore., has applied for Federal aid in financing a proposed dam and hydro-electric power project on the Columbia River at The Dalles. The cost is estimated at between \$20,000,000 and \$40,000,000. The project is being urged in behalf of the improvement of the Columbia River as a navigable river. At Seattle bids are expected to be called next month for the construction of Ruby Dam in Ruby Basin; approximate cost will be \$4,500,000. The cities of Marshfield and Nor'h Bend, Ore., have applied for water rights for 30 cu. ft. per second from the

Coos River. The project will involve construction of a dam and 28 miles of 42-in. pipeline and is estimated to cost \$2,000,000.



..GREAT BRITAIN..

... Pig iron shortage is unrelieved.

o o o

... Export demand for steel improves.

o o o

... Tin plate prices for export may be raised.

LONDON, Nov. 10 (By Cable).—Pig iron shortage is unrelieved. Home deliveries are heavily in arrears and exports of foundry iron are completely suspended. Sales may now be made for second quarter, 1937, delivery, but owing to price uncertainty very few are effected.

Official prices of hematite may be raised 10s. in the near future and sales meanwhile are suspended or made at 10s. premium.

There is an improved export demand for steel, notably from South Africa and India, but home consumers continue to absorb the bulk of the output. Pressure for deliveries still increases, with orders for bars and billets being refused, and orders for structural steel are accepted subject to long delivery delays.

Plate and rail mills are very active. Sheet makers, though busier, as far as home trade is concerned, are dissatisfied with export business. There is a steady flow of new shipbuilding orders.

The Tin Plate Cartel is meeting this week in Paris and, in view of dearer tin, tin plate prices will probably rise. Business is active, with consumers eager to cover forward requirements and several makers are reluctant to sell.

There is a further expansion in Continental iron and steel export demand, especially from the Far East and the United States. Most producers are assured of fulltime operations up to January at least.

British prices and Continental gold prices are both unchanged.



..BIRMINGHAM..

... Rail bookings gain; more orders in sight.

o o o

... Southern pig iron price may be increased.

BIRMINGHAM, Nov. 10.—Texas & Pacific Railway placed an order last week for 7550 tons of 112-lb. rail with the Tennessee Coal, Iron & Railroad Co. This is the second order of the year from that railroad. In the first quarter it also bought about 7800 tons. Rail bookings now total more than 110,000 tons, in addition to large amounts of track accessories. There are prospects of several more orders; one is pending for more than 13,000 tons.

Open-hearth operations have now been stepped up to 16 units out of the 24 in the district. Prior to this year, this total has been equalled only twice since April, 1931. In July, 1933, there were 19 on for a time and in August of that year there were 18 for a time. Gulf States Steel is operating five out of six at Gadsden; Tennessee company, 7 out of nine at Fairfield, and four out of nine at Ensley.

Blast furnace operations continue at 13 stacks. This five-year high point was reached on Oct. 28, when the Woodward Iron Co. blew in its third stack. Tennessee company has six active furnaces, Woodward Iron Co., three; Sloss-Sheffield Steel & Iron Co., two, and Republic Steel Corp., two.

New steel tonnage is plentiful and the market is active in all lines. Pig iron buying is light and confined mostly to scattered spot orders, owing to the fact that most foundries have already covered for the quarter. Iron shipments are heavy.

There is more talk about an advance in price for southern deliveries, possible \$1. Last week deliveries for the eastern seaboard were raised \$1. Aside from stating that consideration is being given to a rise, local officials will make no definite statements as to the price situation.

The Pacific Coast maritime strike has not yet affected shipments from the Birmingham district, according to local sales officials, but the situation is being followed closely and consideration is being given to eventualities that might result.

Steel Employment At Peak Level

EMPLOYMENT in the steel industry broke all records in the history of the steel industry in September, with a total of 526,700 wage earners, according to an announcement by the American Iron and Steel Institute. This was an increase of 23 per cent over September, 1935, when 429,200 were employed, and compares with 522,400 in August of this year.

Payrolls of the industry in September amounted to \$65,611,000 against \$45,893,000 in September, 1935. For nine months of 1936, total payrolls were \$540,779,000, compared with \$557,794,000 for all of 1935.

Of the 97,500 who have been added to steel payrolls during the past year, approximately 91 per cent were wage-earning employees, while 7 per cent were in the clerical departments; 2 per cent were administrative and sales employees.

In 1929 the Census of Manufacturers reported 419,500 wage earners employed in the steel industry, a record which has been exceeded in every month since April of this year, although in none of these months has steel output reached the 1929 level.



... Buying confined mostly to small lots.

... Machine builders book Russian orders.

BOSTON, Nov. 9.—While there continues to be a fairly good movement of small lots in various lines, buying in any quantity remains negligible in structural, pig iron, scrap or pipe. All of these lines have the same story that, after the election, some caution is showing in new commitments, though the rather satisfactory volume of less-than-carlot buying is maintaining a fairly sizable overturn.

It is intimated that machine makers in Connecticut are in receipt or will soon have some sizable orders from Russia, totaling about \$1,000,000 of new business, which should reflect in some of the inter-

ests there engaging with new contracts of more liberal size than for some time past.

There was a fair amount of structural steel sold during the past week, but all of this was in less than 100-ton lots. There is little indication of any sizable projects coming to actual contracts at the moment. Pig iron interests report the same sort of buying that has been progressing for weeks, that is, the demand for small lots for stock in anticipation of any

shipping delays arising from winter weather.

There has been some fresh buying of scrap for Pittsburgh mills, the first of note in some weeks, which gives the scrap market a little better prospect. The local mills, however, remain out of the market, so that a revival of Pittsburgh interest is helpful.

Cast iron pipe makers have had a very satisfactory line of small tonnage business right along, and the past week was no exception.



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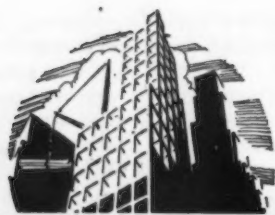
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... NEW YORK ...

... Sellers report a post-election decline in new business.

... Price advances for first quarter considered certain.

... Pig iron moderately active; reinforcing bars in poor demand.

NEW YORK, Nov. 10.—Although the past week has been marked by a moderate tapering in new orders for finished steel, few sellers attach any significance to the decline. It is generally expected that demand will continue to lag for a few weeks and then stage a pick-up as buyers seek to place forward commitments at current price levels. This anticipatory ordering is predicated on the assumption that sellers will advance quotations, an assumption which is considered a certainty by most buyers and sellers in view of the widespread additions to steel workers' wages announced last week.

November plate bookings to date are about on a par with the October average. But backlogs have fallen off slightly and deliveries in two to three weeks are now the rule. District sales offices generally concede that higher quotations for either plates or sheets are unlikely over the remainder of this quarter. More probable is that upward shifts of from \$2 to \$3 a ton will be announced late in the month for first quarter bookings.

Little new railroad business has come up for figuring during the past week. It is probable, however, that an eastern road will enliven next week's market with an inquiry for 50,000 to 60,000 tons of rails.

A badly weakened resale market for pipe has been bolstered slightly since the first of the month. But the reinforcing bar market continues to be harassed by price deviations, even on small tonnages. Both pipe and bars will probably strengthen soon in sympathy with the buoyant undertone typical of all other steel products.

Pig Iron

No further action regarding prices has been taken since Mystic furnace at Everett, Mass., raised its quotation \$1 a ton, effective Nov. 4. On business secured in



... CAST IRON PIPE ...

Union Springs, N. Y., plans main pipe line from Cayuga Lake for water supply, with smaller lines for distributing system. Cost about \$135,000. Financing will be arranged through Federal aid. W. J. Lozier, Inc., 10 Gibbs Street, Rochester, N. Y., is consulting engineer.

Kings Mountain, N. C., plans about 10,000 ft. of 6-in. for water system; also other waterworks installation. Fund of \$96,000 is being arranged through Federal aid for this and sewerage system. W. K. Dickson, Charlotte, N. C., is consulting engineer.

Grand Blanc, Mich., plans pipe lines for water system; also other waterworks installation, including pumping machinery and auxiliaries. Fund of \$54,500 has been arranged through Federal aid. O. F. Gould, 736 Evergreen Street, Flint, Mich., is consulting engineer.

Plymouth, Mich., is arranging fund of \$89,000, of which \$40,000 will be represented by Federal grant for pipe lines for water system and other waterworks installation.

DeGraff, Ohio, is arranging fund of \$60,000 through Federal aid for pipe lines for water system and other waterworks installation. Carl J. Simon, Van Wert, Ohio, is consulting engineer.

Lenexa, Kan., plans pipe lines for water system; also other waterworks installation, including two elevated steel tanks and towers. Fund of \$68,000 will be arranged through Federal aid. Shockley Engineering Co., Graphic Arts Building, Kansas City, Mo., is consulting engineer.

LeRoy, Kan., plans 24,790 ft. of 2 to 8-in. for water system; also about 10,000 cast iron specials, 50,000-gal. elevated steel tank on 100-ft. steel tower. Fund of \$55,900 has been arranged through Federal aid. E. T. Archer & Co., New England

New England other furnaces, of course, will use the Everett base. In view of the higher price there it is believed that strong precedent exists for a mark-up in other districts shortly, but whether producers intend to put an increase into effect for delivery before next year is uncertain. Having had forewarning of this circumstance, local consumers are well covered against year-end requirements, and, in fact, sellers show no inclination to press for business. Books are relatively well filled, and emphasis is upon meeting shipping specifications. It is reported that high water has tied up traffic along the Erie barge canal, no boat having moved down in six days. Shortage of available bottoms has been felt for several weeks.

Reinforcing Steel

Although there has been a fair amount of road work in this district lately, demand for reinforcing bars has been slight. A number of small jobs of less than 100 tons have been reported but few over that figure. Price cutting seems to be general throughout the area. About 500 tons of bars will be up for bidding Nov. 13 at Trenton for two projects in Ocean County, N. J.

Building, Kansas City, Mo., are consulting engineers.

Chickasha, Okla., plans 24-in. line from Saddle Mountain Creek, near Carnegie, to municipal limits, about 52 miles, for main water supply; also smaller size distributing branches. Cost about \$2,500,000 with other waterworks installation. Special election is being arranged to vote bonds. Robert O. Bradley & Sons, Chickasha, are consulting engineers.

Nashua, Mont., plans purchase of pipe for water system; also pumping station and other waterworks installation. Bond issue of \$35,000 has been approved. J. W. Hall, Great Falls, Mont., is consulting engineer.

Alhambra, Cal., plans purchase of 10 and 16-in. for main water line in North Garfield Avenue. Financing for \$25,000 is being arranged through Federal aid. O. S. Roen is city manager in charge.

East Bay Municipal Utilities District of Oakland, Cal., has awarded 1200 tons of 4, 6, 8 and 16-in. pipe to United States Pipe & Foundry Co.

L. L. Caskey Heads Steel Club

L. L. CASKEY, district manager, Republic Steel Corp., was elected president of the Philadelphia Steel Club at a meeting Monday. Other officers are: Henry Viesing, Midvale Co., vice-president; R. F. Curtis, American Steel & Wire Co., secretary and treasurer; and Horace Merriman, Alan Wood Steel Co., and Robert H. McCracken, Central Iron & Steel Co., governors. The organization is composed of the sales representatives of the various steel companies maintaining Philadelphia offices.

MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORP.

Month	1933		1934		1935		1936	
	Ship-ments	Per Cent of Ca-pacity	Ship-ments	Per Cent of Ca-pacity	Ship-ments	Per Cent of Ca-pacity	Ship-ments	Per Cent of Ca-pacity
January	285,137	17.7	331,777	19.8	534,055	31.9	721,414	44.8
February	275,929	18.5	385,500	25.9	583,137	39.2	676,315	45.3
March	256,793	15.3	588,209	35.2	668,056	41.5	783,552	50.5
April	335,321	21.6	643,009	41.5	591,728	36.7	979,907	63.2
May	455,302	27.1	745,063	44.5	598,915	35.8	984,097	63.4
June	603,937	37.4	985,337	61.2	578,108	36.7	886,065	57.1
July	701,322	45.1	369,938	23.9	547,794	34.0	950,851	61.3
August	668,155	39.8	378,023	22.6	624,497	37.3	923,703	59.6
September	575,161	35.6	370,306	23.9	614,933	39.7	961,803	62.0
October	572,897	35.5	343,962	20.6	686,741	41.1	1,007,417	62.6
November	430,358	26.7	366,119	22.7	681,820	42.3	.....	...
December	600,639	38.7	418,630	27.0	661,515	42.7	.....	...
Plus or minus yearly adjustment	(44,283)	...	(19,907)	...	.....	...	.....	...
Total for year..	5,808,235	30.1	5,905,966	30.6	7,371,299	38.3	.....	...

Steel Corporation's Shipments Heaviest Since May, 1930

SHIPMENTS of finished steel products by subsidiary companies of the United States Steel Corp. during October amounted to 1,007,417 tons, an increase of 45,614 tons over the preceding month and 320,676 tons over October, 1935. This was the highest tonnage recorded for any month since May, 1930.

On the basis of shipments, the corporation's finished steel-making capacity operated in October at an

average rate of 62.6 per cent of capacity contrasting with 62.0 per cent for September and 41.1 per cent for the corresponding period a year ago.

Total finished steel tonnage shipped by the corporation's subsidiaries in the first 10 months this year aggregated 8,875,124 tons, an increase of 2,847,160 tons, or 47 per cent over the 6,027,964 tons for the comparable period of 1935.



... Awards of 4450 tons—3500 tons in new projects.

AWARDS

Bridgeton, N. J., 100 tons, Owens-Illinois Glass Co. building, to Bethlehem Steel Co.

Niagara Falls, N. Y., 350 tons, Kimberly-Clark Co. factory, to Bethlehem Steel Co.

Buffalo, 650 tons, Tift Street viaduct foundations, to Concrete Steel Co.

Chicago, 125 tons, Caspers Tin Plate Co., to Concrete Engineering Co.

Ashton, Idaho, 316 tons, material for Grassy Lake Dam, to an unnamed bidder.

Denver, 435 tons, All-American Canal project, to Bethlehem Steel Co.

Los Angeles, 194 tons, classroom for Los Felix Boulevard school, to Blue Diamond Steel Corp.

Los Angeles, 126 tons, store for George Elkins Co., to Blue Diamond Steel Corp.

Los Angeles, 975 tons for United States Treasury Department, to California Hardware Co.

Los Angeles, 133 tons, West Vernon Avenue school, to Consolidated Steel Corp.

Los Angeles, 106 tons, Eastern Outfitting Co., to Graham Brothers.

Los Angeles, 353 tons, Camarillo State hospital, to Soule Steel Co.

Los Angeles, 171 tons, St. Paul's Church, to Soule Steel Co.

Los Angeles, 390 tons, South Los Angeles Junior College, to Consolidated Steel Corp.

NEW REINFORCING BAR PROJECTS

Ocean County, N. J., 400 tons, route 40; bids Trenton, N. J., State highway department, Nov. 13.

Ocean County, 100 tons, route 34; bids Trenton, State highway department, Nov. 13.

Toledo, 1000 tons, vocational building.

Chicago, 500 tons, addition to Kraft Cheese plant.

Le Claire, Iowa, 600 tons, dam No. 14 in Mississippi River; Central Engineering Co., Davenport, Iowa, low bidder on general contract.

St. Louis, 110 tons, public school for negroes; A. H. Heissler Building & Contracting Co., St. Louis, low bidder on general contract.

Santa Fe, N. M., 243 tons, railroad underpass and approaches; bids Nov. 12.

Soda Springs, Cal., 118 tons, State highway project; bids Nov. 18.

Los Angeles, 148 tons, Raymond Avenue school; bids opened.

Helena, Mont., 100 tons, dam and appurtenance structure for Ruby River project; bids opened.

Denver, 737 tons, All-American Canal project; bids opened.

Denver, 142 tons, Salt River project; bids opened.

Salaried Workers May Get Increases

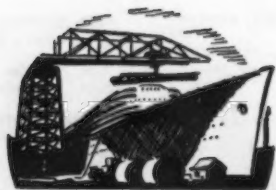
CARNEGIE-ILLINOIS STEEL CORP. is working on a plan, which, if successful, will assure an increase in pay averaging around 10 per cent for all white collar workers making under \$5,000 a year who were not covered in last week's offers. If this latest wage increase is granted, and there is every indication that it will be, actual increases will average from 5 to 15 per cent, depending on the position involved. It is understood that employees in the higher brackets above \$5,000 a year may get individual adjustments in their salaries.

Dravo-Doyle Co. Books Large Orders

DRAVO-DOYLE CO., Pittsburgh, reports numerous sales of Lee direct-fired hot air heating equipment to steel mills. One large sheet and tin plate company has purchased 33 unit heaters of 700,000 B.t.u. per hr. capacity. Other purchasers are Greer Steel Co., Anderson, Ind., six natural gas fired units; Pittsburgh Bridge & Iron Co., Chicago, one unit; Acme Steel Co., Chicago, one Lee hot air heater for drying sheets from continuous pickling bath, and two for defogging pickling department.

In addition to these direct-fired unit heater sales, Dravo-Doyle is installing two large tubular hot air heaters for West Leechburg division of Allegheny Steel Co., and also two for new warehouse and manufacturing departments of LaSalle Steel Co. at Hammond, Ind.

Harry E. Sheldon, president of Allegheny Steel Co., has announced the sale of 43,000 shares of his Allegheny common stock to a banking syndicate. Mr. Sheldon, who was a founder of the company in 1901, continues as one of its largest stockholders. Resale of the stock to investors was completed last month, it was stated.



... PHILADELPHIA ...

... Further declines in business reported.

o o o

... Steel scrap price is lower.

o o o

... Ingot operations down to 55 per cent of capacity.

PHILADELPHIA, Nov. 10.—There has been a noticeable decrease in finished steel orders which seems to be due in part to the fact that railroads and shipyards are not actively specifying at the moment and construction projects are coming out slowly. The almost certain increase in prices, following wage advances, is counted on to stimulate a fresh buying wave to last throughout the quarter. Pig iron sales are very good, and the expected price increase in that material will probably not affect sales to a great extent, since most buyers in anticipation of such a move, have already covered their requirements for the remainder of the year.

The first unit of Alan Wood's new continuous hot mill came into production yesterday exactly on schedule, and is at present rolling up to 48 in. wide and from 14 to 22 gage thick. The second unit is expected to be ready for rolling in three or four weeks.

No. 1 heavy melting steel is now quoted at \$15 to \$15.50 while No. 2 steel is \$14.00 flat.

Ingot output is down one-half point to 55 per cent of capacity.

Sheets and Plates

Until the last week or so sheets were about the only finished steel product not to show a decline in orders, but now they, too, have joined the ranks of those which have suffered recent losses in business. Sellers, however, are very optimistic regarding sheet demand for the remainder of the year, since the automobile industry is expected to have a banner year in 1937. A part of the slowing in business is due to the coming of inclement weather which prevents much outdoor work and lowers, accordingly, orders for galvanized sheets, the backlog on which at present is about six weeks, in some mills, for lighter gages. Terne plate is active

and is being specified more and more as a roofing material. Sales of this product are reported to be the best in years. Plates are still very easy, with deliveries obtainable in three to four days at several mills. A first of the year price advance in plates would stimulate demand for this year, and is looked for in most quarters.

Pig Iron

District melt is continuing at a fairly high rate and pig iron sales are good. Foundries are active and, although most regular customers are covered for the rest of the year, sales are expected to continue at about present levels or higher in anticipation of a price

increase. Foreign iron is not presenting as much of a problem as was the case a few months ago, owing to the stringency of demand for that product in Europe, especially England.

Shapes and Bars

Structural activity was more pronounced this week with an award to American Bridge Co. of 720 tons of shapes for an Armstrong Cork Co. building in Lancaster, Pa., heading the list. Highway projects in Lancaster and Clearfield counties totaled 400 tons of shapes for Bethlehem Steel Co., while an Owens-Illinois Glass Co. structure in Huntington, W. Va., requiring 360 tons of shapes, went to Pittsburgh Bridge & Iron Co. A sizeable tonnage for highway work is awaiting disposition, bids having been taken during the past two and three weeks at Harrisburg. Backlogs of from two to three weeks are reported in structural shapes. Bethlehem received an award of 100 tons of reinforcing bars for a building in New Jersey. Activity in this product is very quiet, and few awards of more than carload lots are reported.

Imports

The following iron and steel imports were received here last week: 3125 tons of chrome ore from Cuba; 2953 tons of pig iron from Soviet Russia; 92 tons of steel tubes, 7 tons of steel forgings and 41 tons of steel bars from Sweden.



... CINCINNATI ...

... Demand for sheets holds at high level.

o o o

... Ingot output in southern Ohio at 93 per cent.

CINCINNATI, Nov. 10.—The election had no effect on the district sheet steel market the past week. The unusually brisk demand is holding to a level of near 150 per cent of capacity. Deliveries are more extended as mill interests report backlogs to be slightly above a month's output. All units are booked at full schedules. Automobile manufacturers, while specifying currently at their normal market proportion of 30 per cent,

are limiting new material to estimated current needs. Prices continue to be steady, but the trade opinion is fairly well crystallized that an advance will be imperative in the near future.

Ingot steel production is up to about 93 per cent of capacity. Thirty-two out of 34 open hearths are in operation, with two units operating all furnaces.

Increased activity in the finished steel market and advances of iron prices in the Northeast have strengthened the district pig iron market perceptibly. Sales in the week totaled about 2000 tons. While melters are anticipating needs to a certain extent, there is no apparent overordering to build inventories beyond reasonable future requirements. Prices on both Northern and Southern iron are undisturbed, but the trade is expecting a revision upward. The melt sagged a bit during the past week, probably under the election influence. Melters report prospects good, however, so the foundry operations this week should rebound.



....BUFFALO....

... *Pig iron shipments at a good rate.*

o o o

... *Open-hearth output drops, then recovers.*

BUFFALO, Nov. 10.—Operations of Buffalo steel industry promised to be somewhat higher this week than last. Last week, Republic reduced its seven-open hearth operation by two during the week, but this week is back to six and may run seven. Bethlehem's Lackawanna plant was running 22 over the week end and possibility of 23 active units was seen.

A plant for the Kimberly-Clark Co. at Niagara Falls, requiring 350 tons of reinforcing bars was awarded to a Buffalo fabricator. The Tiff Street superstructure and foundations, 650 tons of reinforcing bars each, were awarded. Other allocations in the reinforcing bar, re-rolled rail and structural fields, were for small-sized lots.

Pig iron new business was light during the week, but producers expressed themselves as more than satisfied with the heavy specifying by all types of foundries against recent contracts.

ter, and there was some additional heavy buying. Most melters now have purchased enough pig iron for their first quarter requirements.

Word comes from the agricultural implement belt that the melt is increasing rapidly, several of the plants operating with night shifts, while others will put them on shortly. The stove interests are producing at a peak rate, at which operations are expected to continue for the rest of November, with a let up, but no shut down likely during December, as has been the case heretofore.

October business with the warehouses was between 35 and 40 per cent ahead of the same month a year ago, but slightly below September this year. October business continued at the high rate of the preceding month until the last week, when it lagged, but there has been a pick-up since the first of the month. Fabricators of structural steel are reported to be operating at about 50 per cent of capacity, but, with little new business being booked, the backlog is very low.

The St. Louis-Southwestern Railway, which has asked authority to expend \$1,178,500 for the purchase of 10 passenger coaches, shop machinery, and the building of five locomotives, has asked for an allowance of an additional \$775,715 for additions and betterments including \$81,330 for tie plates and rail anchors, and \$131,065 for applying steel sides and auto doors to 100 box cars.



RAILROAD BUYING

Union Pacific has announced expenditures of approximately \$8,000,000 for 20 new engines and 45 passenger cars, 300 automobile freight cars and air-conditioning, redecorating, re-equipping and otherwise modernizing other passenger cars.

St. Louis-Southwestern has asked for authority to spend \$775,715 for betterments and improvements, in addition to \$1,178,500 previously requested. New items include \$81,330 for tie plates and rail anchors, and \$131,065 for applying steel sides and auto doors to 100 box cars.

Utah Copper Co. has ordered 12 electric locomotives from General Electric Co.

Virginian is asking for prices on repair of 500 116-ton gondola cars.

Western Maryland is inquiring for 100 to 500 box cars and 100 gondola cars.

Western Pacific is inquiring for 200 box cars.

Chicago & Eastern Illinois has secured permission to purchase 500 50-ton box cars from General American Transportation Corp.

Nashville, Chattanooga & St. Louis will spend \$123,377 on an air conditioning program this fall and early next year.

Woodward Iron Co. will buy five gondola cars.

RAILS AND TRACK SUPPLIES

Chicago & North Western has distributed 48,750 tons of rails as follows: 12,500 tons to Inland Steel Co., 28,750 tons to Carnegie-Illinois Steel Corp. and 7500 tons to Bethlehem Steel Co. This railroad has also placed 14,000 tons of track accessories.

Texas & Pacific has ordered 7550 tons of 100-lb. rails from Tennessee Coal, Iron & Railroad Co.



....ST. LOUIS....

... *Pig iron melters buying heavily.*

o o o

... *Agricultural implement and stove makers running at high rate.*

ST. LOUIS, Nov. 10.—The advance of \$1 a ton by an Eastern interest in the price of pig iron has had no effect on prices in this section, but it did put another scare into the minds of melters that there would be an advance before the end of the present quar-

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in all sizes



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FABRICATED STEEL

... Lettings advance to 26,000 tons from 15,850 last week.

o o o

... New projects again lower at 9250 tons as against 12,935 tons in the previous week.

o o o

... Plate awards only 230 tons.

NORTH ATLANTIC STATES

Springfield, Vt., 100 tons, fair grounds bridge, to American Bridge Co.

Stratford, Conn., 125 tons, Tilo Roofing Co., building, to New England Iron Works.

New Haven, Conn., 430 tons, Brainard Field, hangar, to Lehigh Structural Steel Co.

New York, 6500 tons, Sixth Avenue subway, section 9, to Bethlehem Steel Co.

Brooklyn, 570 tons, nine-story apartment building, 160 Columbia Heights, to Bethlehem Fabricators, Inc.

Tonawanda, N. Y., 350 tons, stock shed, Tonawanda Boxboard Co., to Lackawanna Steel Construction Co.

Buffalo, 2620 tons, Tift Street bridge, to Bethlehem Steel Co.

Auburn, N. Y., 130 tons, post office, to Utica Structural Steel Co.

Chenango County, N. Y., 100 tons, State highway bridge, to American Bridge Co.

Lancaster, Pa., 720 tons, Armstrong Cork Co. building, to American Bridge Co.

Cambria County, Pa., 205 tons, State highway bridge, to Fort Pitt Bridge Works Co.

Lancaster County, Pa., 100 tons, highway work, route 36, to Bethlehem Steel Co.

Clearfield County, Pa., 300 tons, highway work, to Bethlehem Steel Co.

Homestead, Pa., 550 tons, annealing building, Mesta Machine Co., to Bethlehem Steel Co.

Homestead, 250 tons, new floor in forge shop, Mesta Machine Co., to Bethlehem Steel Co.

Washington, 220 tons, hockey rink, J. C. Cambria, to Dietrich Brothers.

THE SOUTH

Huntington, W. Va., 375 tons, addition to warehouse, Owens-Illinois Glass Co., to Pittsburgh Bridge & Iron Works.

Knoxville, Tenn., 920 tons, transmission towers for TVA, to American Bridge Co.

Ashwood, Tenn., 2000 tons, Monsanto Chemical Co., to Ingalls Iron Works Co.

Georgetown, S. C., 2500 tons, Southern Craft Corp., to Stupp Brothers Bridge & Iron Co.

CENTRAL STATES

Battle Creek, Mich., 220 tons, addition to buildings, W. K. Kellogg Co., to R. C. Mahon Co.

Ewen, Mich., 150 tons, bridge, to an unnamed fabricator.

Toledo, 190 tons, two additions for Libbey-Owens-Ford Plate Glass Co., to Bethlehem Steel Co.

McCook, Ill., 1450 tons, Electro-Motive Corp., to Fort Pitt Bridge Works Co.

Chicago, 1500 tons, Museum of Science and Industry, to Bethlehem Steel Co.

Polk County, Minn., 355 tons, bridge, to American Bridge Co.

WESTERN STATES

Riverton, Wyo., 450 tons, seven bridges, to Minneapolis-Moline Power Implement Co.

Mare Island, Cal., 100 tons, Federal project, to Judson Pacific Co.

San Francisco, 818 tons, pier sheds, to Columbia Steel Co.

Los Angeles, 500 tons, Western District high school, to Pacific Iron & Steel Co.

Los Angeles, 500 tons, structural steel ribs for tunnel supports, Metropolitan Water District, to Western Pipe & Steel Co.

Los Angeles, 300 tons, refinery for Spencer, Kellogg Co., to Minneapolis-Moline Power Implement Co.

San Bernardino, Cal., 182 tons, Bureau of Treasury project, to Bethlehem Steel Co.

Los Angeles, 100 tons, Pittsburgh Plate Glass Co., to Bethlehem Steel Co.

Los Angeles, 100 tons, Los Angeles Junior College, to Modern Iron Works.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 900 tons, repairs to Manhattan bridge.

New York, 950 tons, alterations to New York Historical Society building.

New York, 250 tons, health and teacher building.

Brooklyn, 300 tons, Fulton Savings Bank building.

Avon-Beimmar, N. J., 375 tons, Big Shark River lift bridge.

Weehawken, N. J., 310 tons, field office building for Authority of Port of New York.

Huntingdon County, Pa., 450 tons, highway work, route 192; bids Nov. 20.

Wyoming County, Pa., 130 tons, highway work, route 11; bids Nov. 20.

Annapolis, Md., 300 tons, Isherwood Hall extension for Navy Department.

SOUTH AND SOUTHWEST

Huntington and Culloden, W. Va., 300 tons, bridges.

Eckman, W. Va., 420 tons, overhead bridge.

Bonham, Tex., 1700 tons, bridge.

Deming, N. M., 250 tons, subway.

Santa Fe, N. M., 250 tons, railroad underpass and approaches; bids Nov. 12.

CENTRAL STATES

Detroit, 250 tons, Chrysler Corp. factory building.

Detroit, 300 tons, storage warehouse, Grand Trunk Western Railroad.

Cleveland, 700 tons, sewage disposal plant; Lundoff-Bicknell Co. general contractor.

Evanston, Ill., 200 tons, post office.

Chicago, 750 tons, Chicago Junction railway bridge.

Cedar Rapids, Iowa, 350 tons, bridge.

WESTERN STATES

Denver, 102 tons, six State highway bridges; bids Nov. 12.

Salt Lake City, Utah, 400 tons, Montgomery Ward Store.

FABRICATED PLATES

AWARDS

Bridgeville, Pa., 120 tons, 37 small tanks, to Buffalo Tank Co.

New York, 110 tons, Cooling Tower Co., to A. J. Fritschy Corp.

Chicago, Standard Oil Co. of Indiana has placed contract with Manitowoc Ship Building Corp., Manitowoc, Wis., for 2,700,000-gal. welded-steel oil tanker, costing approximately \$1,000,000.

NEW PROJECTS

Bureau of Supplies and Accounts, Navy Department, Washington, will open bids Nov. 27 for 2525 tons of plates and 145 tons of black and galvanized sheets for three submarines.

SHEET PILING

AWARDS

Haverhill, Mass., 650 tons, sewer project, to Jones & Laughlin Steel Corp.

Newkirk, N. M., 875 tons, Conchas dam project, to Bethlehem Steel Corp.

Potholes, Cal., 300 tons, All-American canal project, Bureau of Reclamation, to Carnegie-Illinois Steel Corp.

NEW PROJECTS

Rehobath Bay, Del., 1450 tons, jetties on the Broadkill River; bids Nov. 13 by United States Engineer's Office, Philadelphia.

Wroth Point on Elk River, Md., 284 tons, bulkhead; bids Nov. 15 by United States Engineer's Office, Baltimore.

Monroe, La., 1203 tons, concrete steel sheet pile levee wall; bids Dec. 3 by United States Engineer's Office at Vicksburg, Miss.



...NON-FERROUS...

... Domestic copper established at 10.50c.; lead prices advance \$6 further during week.

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... Zinc marked up \$2 a ton; tin prices soar as restriction scheme succeeds.

NEW YORK, Nov. 10—All metal markets were feverish last week, and prices advanced along four fronts. A higher domestic quotation for electrolytic copper took hold on Friday when producers raised the price ½c. to the basis of 10.50c. a lb., Connecticut Valley delivery. Sales made

almost immediately thereafter entrenched the market at that figure. While this had the effect of narrowing the extreme spread between domestic and foreign marts, copper for export has subsequently again moved higher, instances being recorded this morning of transactions at 10.87½c., c.i.f.,

European ports. At the moment inquiry from abroad has relaxed somewhat, though scrap exportation continues heavy. Domestic sales through Saturday totaled 74,434 tons, representing exactly one week of November buying.

Lead

Two increases last week in the price of domestic pig lead, each of \$2 a ton, and a further advance this morning of \$2 a ton has established the market firmly at 4.95c. a lb., St. Louis, and 5.10c., New York. Heavy consumer buying, which has characterized the whole upward movement of \$10 a ton since Oct. 26, is reported unchanged in intensity, and sellers are being forced to deal out the metal sparingly to regular customers.

Zinc

Prices were advanced \$2 a ton on Saturday by certain sellers, but not until yesterday did the market move uniformly to 4.95c., East St. Louis basis. Buying on the rise was heavy, and over 18,000 tons of new business had entered producers' books by the week's close. Conditions were described as being a sellers' market, with buyers for the most part hard pressed to find enough tonnage at 4.85c. The week's activity pushed unfilled orders upward above 70,000 tons, or to a level in excess of the industry's stocks of 68,892 tons at Nov. 1. Eventual further advances in the price are expected. October shipments totaled 54,035 tons, and production was 46,297 tons. Stocks declined 7738 tons to 68,892 tons, as mentioned.

Tin

Tin prices mounted steeply during the week upon information that Siam had signed the restriction agreement at the international committee meeting on Nov. 5. Details of the agreement have not been officially released, but it is known that concessions were made on both sides. Demand for the metal grew strong and sellers were caught short of supplies. The spot Straits price at New York advanced steadily from last Tuesday's quotation of 45.87½c. to a representative level of about 54.00c. today. London prices also were up sharply, with standard cash at £244 10s. on this morning's session and three-months at £241 10s. The Eastern price was £245 12s. 6d.

Non-Ferrous Averages

	Oct. aver.
Electrolytic copper, Conn.	9.787c. a lb.
Lake copper, Eastern delivery	9.912c. a lb.
Straits tin, spot, N. Y.	44.955c. a lb.
Zinc, East St. Louis.	4.850c. a lb.
Zinc, New York.	5.225c. a lb.
Lead, St. Louis.	4.480c. a lb.
Lead, New York.	4.630c. a lb.

The Week's Prices. Cents Per Pound for Early Delivery

	Nov. 4	Nov. 5	Nov. 6	Nov. 7	Nov. 9	Nov. 10
Electrolytic copper, Conn.*	10.00	10.00	10.50	10.50	10.50	10.50
Lake copper, N. Y.	10.12½	10.12½	10.62½	10.62½	10.62½	10.62½
Straits tin, Spot, New York.	47.50	49.62½	50.87½	...	53.25	54.00
Zinc, East St. Louis.	4.85	4.85	4.85	4.85	4.95	4.95
Zinc, New York†.	5.22½	5.22½	5.22½	5.22½	5.32½	5.32½
Lead, St. Louis.	4.75	4.85	4.85	4.85	4.85	4.95
Lead, New York.	4.90	5.00	5.00	5.00	5.00	5.10

* Delivered Connecticut Valley; price ¼c. lower delivered in New York.

† Includes emergency freight charge.

Aluminum, virgin 99 per cent plus 19.00c.-21.00c. a lb. delivered.

Aluminum, No. 12 remelt No. 2 standard, in carloads, 16.75c. a lb. delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.

Antimony, Asiatic, 12.50c. a lb., New York.

Quicksilver, \$88.50 to \$92.00 per flask of 76 lb.

Brass ingots, commercial 85-5-5-5, 10.75c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.	54.50c. to 55.50c.
Tin, bar.	56.50c. to 57.50c.
Copper, Lake.	11.50c. to 12.50c.
Copper, electrolytic.	11.50c. to 12.50c.
Copper, castings.	10.75c. to 11.75c.
*Copper sheets, hot-rolled.	17.75c.
*High brass sheets.	15.87½c.
*Seamless brass tubes.	18.12½c.
*Seamless copper tubes.	18.25c.
*Brass rods.	13.87½c.
Zinc, slabs.	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over.	10.25c.
Lead, American pig.	5.75c. to 6.75c.
Lead, bar.	6.75c. to 7.75c.
Lead, Sheets, cut.	8.75c.
Antimony, Asiatic.	13.00c. to 14.00c.
Alum., virgin, 99 per cent plus.	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.	18.50c. to 20.00c.
Solder, ½ and ⅓.	31.00c. to 32.00c.
Babbitt metal, commercial grades.	25.00c. to 65.00c.

* These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33½ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig.	57.50c.
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Tin, Bar.	59.50c.
Copper, Lake.	11.50c. to 11.75c.
Copper, electrolytic.	11.50c. to 11.75c.
Copper, castings.	11.25c. to 11.50c.
Zinc, slabs.	6.50c. to 6.75c.
Lead, American pig.	5.70c. to 6.00c.
Lead, bar.	8.50c.
Antimony, Asiatic.	15.00c.
Babbitt metal, medium grade.	20.25c.
Babbitt metal, high grade.	61.50c.
Solder, ½ and ⅓.	32.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal).

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.	7.75c.	8.50c.
Copper, hvy. and wire.	7.62½c.	8.12½c.
Copper, light and bottoms.	7.12½c.	7.62½c.
Brass, heavy.	4.75c.	5.37½c.
Brass, light.	4.00c.	4.75c.
Hvy. machine composition.	6.75c.	7.25c.
No. 1 yel. brass turnings.	5.75c.	6.25c.
No. 1 red brass or compos. turnings.	6.37½c.	6.87½c.
Lead, heavy.	4.00c.	4.37½c.
Sheet aluminum.	13.25c.	14.75c.
Zinc.	2.50c.	2.87½c.
Cast aluminum.	12.12½c.	13.25c.



IRON AND STEEL SCRAP

... Composite declines 25c. to \$16.33 a gross ton.

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... Undertone at Chicago and Cleveland is strong, but other districts are somewhat easier.

REFLECTING moderate declines at Pittsburgh and in eastern Pennsylvania, the scrap composite for the current period is down to \$16.33, as compared with \$16.58 a week ago. For the most part, the entire scrap market is somewhat confused, with several important districts comparatively inactive while other areas are enlivened by consumer buying and a buoyant price undertone. Despite the drop in the composite this week there is nothing in the picture to indicate that the country's scrap prices are slated for a general revision downward. On an average, scrap is not coming out in large amounts at present price levels, and this situation may be even further exaggerated through the turn of the year. For not only will steel production be maintained near the present level, but the accumulation and preparation of scrap may soon be delayed by snow and low temperatures.

Pittsburgh

A moderate-size sale to a consuming interest late last week brought \$17.25 for No. 1 steel. However, brokers are picking up very little scrap at \$17 and in many cases are paying \$17.25. Some dealers who took part of the \$17.25 sale are actually paying this much to cover. As a reflection of these transactions, No. 1 steel is off 25c., being quotable at \$17 to \$17.50. The strong undertone which the market has exhibited in the face of lack of substantial purchases over the past several weeks still exists. No large sales are expected by producers over the next week or so. Meanwhile, the market continues to mark time.

Chicago

This market is without an important trend. Prices for heavy melting steel appear strong at \$16.75. Railroads are getting close to \$17, and brokers are still forced to reach long distances for needed supplies. There is speculative activity in cast iron wheels, the trade believing that railroad buy-

ing will bring wheel foundries in for heavy tonnages. The last water shipments to Lake Erie are being accelerated, for navigation will be closed within the next week.

Cleveland

Although there is no new consumer demand the supply of steel making scrap has become scarcer, and brokers with outstanding orders have advanced the prices they are paying for these grades from 50c. to \$1 a ton. For No. 1 heavy melting steel brokers are paying as high as \$16.25 for Cleveland delivery, and this grade is bringing \$16.50 for shipment to Lorain. The market as a whole has a very firm tone. Blast furnace scrap is being bought by brokers at the recently advanced prices.

Philadelphia

Although fundamentally strong due to the belief that additional buying will develop in anticipation of sustained mill operations, the market here declined 50c. this week in the absence of definite sales. No. 1 steel is now \$15 to \$15.50 while No. 2 is quotable at \$14. One of the leading brokers continues to publicly pay \$15 for No. 1 steel although the leading consumer in eastern Pennsylvania is said to be securing some tonnage at \$14.50, delivered Bethlehem.

Birmingham

Advances of from 50c. to \$1 have been made in practically all grades. There is now an active demand and shipments have improved. Scrap stocks of dealers are steadily diminishing as receipts recently have been light.

Buffalo

Sales have been light, but the market is firm, particularly for grades of cast for which there is a demand from western New York and northern Pennsylvania points. Dunkirk, Attica, Batavia and Erie are among the points demanding this grade of material. Apparently the supply is limited, and indications are that consumers will pay more than quoted prices for a tonnage of this material. Large consumers have shown no disposition to buy

heavy melting steel grades during the past week, being principally occupied with moving incoming shipments from barges and lake boats to stock piles.

New York

Mills which buy from this district have all the tonnage on hand they can handle at present and are making no new purchases. Unloading of pig iron and coke at the yards is partly responsible. New York dealers are paying 50c. less for No. 2 steel at \$10 to \$10.25, but No. 1 continues to bring as high as \$12. Demand for export is quiet, and quotations have receded to a flat rate of \$11 for No. 1 and \$10 for No. 2. Stove plate for export is down to \$9. Outcoming supplies in the metropolitan area include 4048 tons of rails and accessories scrapped from Manhattan surface lines. The city will take bids up to Nov. 17. The usual railroad lists are out, and 10,000 tons of No. 1 steel is involved in the Pennsylvania Railroad's offering. Bids on this tonnage must be in by Nov. 11.

St. Louis

St. Louis interests are endeavoring to purchase a Missouri Pacific offering of 100 carloads of scrap iron, including 30 carloads of melting steel and 25 carloads of rails, and a St. Louis-San Francisco Railway list of 4000 tons, including 1000 tons each of rails and miscellaneous scrap and 500 tons of wheels, which close this week. If these supplies are obtained, the large short interest here will be relieved to some extent. There was no buying by the mills during the week. Prices are unchanged.

Detroit

This market remains at the same level as last week, although mill price offerings are lower than present quoted prices. Bids on all recent lists have been rather strong, and there is every indication that the market will remain firm. There was one group of bids on long turnings very much above the market, but the prices are not felt to have set the market since this particular seller usually gets a premium.

Cincinnati

Mill interest in old materials is reviving, but refusal to meet dealers' quotations is retarding commitments. The market tends stronger as dealers hold supplies firm at present quotations and seek to extend their positions. Consumers' inventories are diminishing to the place where the trade indicates heavy buying is becoming imperative.

United Iron & Metal Co., Pittsburgh, last week purchased the Ford Motor Co. glass plant at Glassmere, Pa. The United company will immediately start wrecking operations and expect to realize between 6000 and 6500 tons of scrap. The plant and all machinery are to be demolished.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mtng. steel.	\$17.00 to \$17.50
No. 2 hvy. mtng. steel.	15.00 to 15.50
No. 2 RR. wrought.	17.00 to 17.50
Scrap rails	17.50 to 18.00
Rails, 3 ft. and under.	20.00 to 20.50
Comp. sheet steel	17.00 to 17.50
Hand. bundled sheets.	16.00 to 16.50
Hvy. steel axle turn.	15.50 to 16.00
Machine shop turn.	11.50 to 12.00
Short shov. turn.	12.00 to 12.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	12.00 to 12.50
Cast iron carwheels.	17.00 to 17.50
Hvy. breakable cast.	14.50 to 15.00
No. 1 cast	16.00 to 16.50
RR. knuckles & cplrs.	20.00 to 20.50
Rail coil & leaf springs	20.00 to 20.50
Rolled steel wheels.	20.00 to 20.50
Low phos. billet crops.	20.50 to 21.00
Low phos. sh. bar.	20.00 to 20.50
Low phos. punchings.	19.50 to 20.00
Low phos. plate scrap.	19.50 to 20.00
Steel car axles	19.50 to 20.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mtng. steel.	\$15.75 to \$16.25
No. 2 hvy. mtng. steel.	14.75 to 15.25
Comp. sheet steel	15.00 to 15.50
Light bund. stampings	11.50 to 12.00
Drop forge flashings.	14.50 to 15.00
Machine shop turn.	10.50 to 11.00
Short shov. turn.	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
Steel axle turnings.	12.00 to 12.50
Low phos. billet crops	19.00 to 19.50
Cast iron borings	11.00 to 11.50
Mixed bor. & turn.	11.00 to 11.50
No. 2 busheling	11.00 to 11.50
No. 1 cast	16.75 to 17.25
Railroad grate bars.	9.00 to 9.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	16.50 to 17.00
Railroad malleable	17.75 to 18.00
Cast iron carwheels.	15.00 to 15.50

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mtng. steel.	\$15.00 to \$15.50
No. 2 hvy. mtng. steel.	14.00 to 14.50
Hydraulic bund., new.	15.00 to 15.50
Hydraulic bund., old.	12.50 to 13.00
Steel rails for rolling.	17.00 to 17.50
Cast iron carwheels.	16.50 to 17.00
Hvy. breakable cast.	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	12.50 to 13.00
Railroad malleable	16.50 to 17.00
Machine shop turn.	9.50 to 10.00
No. 1 blast furnace	8.50 to 9.00
Cast borings	8.00 to 8.50
Heavy axle turnings.	12.50 to 13.00
No. 1 low phos. hvy.	20.00 to 20.50
Couplers & knuckles.	19.50 to 20.00
Rolled steel wheels.	19.50 to 20.00
Steel axles	20.50 to 21.00
Shafting	20.50 to 21.00
No. 1 RR. wrought.	16.00 to 16.50
Spec. iron & steel pipe.	13.50 to 14.00
Bundled sheets	14.00 to 14.50
No. 1 forge fire.	14.50 to 15.00
Cast borings (chem.).	10.50 to 13.00

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mtng. steel.	\$16.25 to \$16.75
Auto. hvy. mtng. steel.	14.00 to 14.50
Shoveling steel	16.25 to 16.75
Hydraul. comp. sheets.	15.00 to 15.50
Drop forge flashings.	12.50 to 14.00
No. 1 busheling	14.75 to 15.25
Rolled carwheels	18.00 to 18.50
Railroad tires, cut	18.00 to 18.50
Railroad leaf springs.	17.50 to 18.00
Axle turnings	15.00 to 15.50
Steel coup. & knuckles	18.00 to 18.50
Coil springs	19.00 to 19.50
Axle turn. (elec.)	16.00 to 16.50
Low phos. punchings.	18.75 to 19.25
Low phos. plates, 12 in. and under	18.75 to 19.25
Cast iron borings	9.50 to 10.00
Short shov. turnings.	10.50 to 11.00
Machine shop turn.	8.50 to 9.00
Rerolling rails	17.00 to 17.50
Steel rails under 3 ft.	17.00 to 17.50
Steel rails under 2 ft.	18.50 to 19.00
Angle bars, steel	18.00 to 18.50
Cast iron carwheels	16.50 to 17.00
Railroad malleable	18.00 to 18.50
Agric. malleable	15.00 to 15.50
Per Net Ton	
Iron car axles	\$18.50 to \$19.00
Steel car axles	17.75 to 18.25
No. 1 RR. wrought.	14.25 to 14.75

No. 2 RR. wrought.	\$14.50 to \$15.00
No. 2 busheling, old.	6.00 to 6.50
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast.	14.00 to 14.50
Clean auto. cast.	13.00 to 13.50
No. 1 railroad cast.	13.50 to 14.00
No. 1 agric. cast	11.00 to 11.50
Stove plate	8.75 to 9.25
Grate bars	9.50 to 10.00
Brake shoes	10.50 to 11.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mtng. steel.	\$16.00 to \$16.50
No. 2 hvy. mtng. steel.	14.50 to 15.00
Scrap rails	16.00 to 16.50
New hy. b'ndled sheets	14.50 to 15.00
Old hydraulic bundles	13.00 to 13.50
Drop forge flashings	14.50 to 15.00
No. 1 busheling	14.25 to 15.00
Hvy. axle turnings.	10.50 to 11.00
Machine shop turn.	9.50 to 10.00
Knuckles & couplers	18.50 to 19.00
Coil & leaf springs.	18.50 to 19.00
Rolled steel wheels.	18.50 to 19.00
Low phos. billet crops.	18.50 to 19.00
Short shov. turnings.	10.25 to 10.75
Mixed bor. & turn.	10.25 to 10.75
Cast iron borings	10.25 to 10.75
No. 2 busheling	11.00 to 11.50
Steel car axles	17.00 to 17.50
Iron axles	12.00 to 12.50
No. 1 machinery cast.	15.00 to 15.50
No. 1 cupola cast	14.50 to 15.00
Stove plate	12.50 to 13.00
Steel rails under 3 ft.	17.50 to 18.00
Cast iron carwheels.	15.50 to 16.00
Railroad malleable	17.00 to 18.00
Chemical borings	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel.	\$12.50 to \$13.00
Scrap steel rails	12.50 to 13.00
Short shov. turnings.	8.00 to 8.50
Stove plate	8.50 to 9.00
Steel axles	15.00 to 15.50
Iron axles	15.00 to 15.50
No. 1 RR. wrought.	10.00 to 10.50
Rails for rolling	14.00 to 14.50
No. 1 cast	13.50 to 14.00
Tramcar wheels	13.00 to 13.50

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. steel.	\$15.00 to \$15.50
No. 1 hvy. melting.	14.50 to 15.00
No. 2 hvy. melting.	13.00 to 13.50
No. 1 locomotive tires.	13.50 to 14.00
Misc. stand.-sec. rails.	15.25 to 15.75
Railroad springs	16.50 to 17.00
Bundled sheets	9.50 to 10.00
No. 2 RR. wrought	14.50 to 15.00
No. 1 busheling	8.50 to 9.00
Cast bor. & turn.	5.50 to 6.00
Rails for rolling	15.75 to 16.25
Machine shop turn.	4.00 to 4.50
Heavy turnings	10.50 to 11.00
Steel car axles	17.00 to 17.50
Iron car axles	18.00 to 18.50
No. 1 RR. wrought.	12.50 to 13.00
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars.	15.50 to 16.00
Cast iron carwheels.	13.50 to 14.00
No. 1 machinery cast.	12.50 to 13.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast.	12.50 to 13.00
Stove plate	7.50 to 8.00
Agricul. malleable	12.50 to 13.00
Grate bars	9.00 to 9.50
Brake shoes	11.25 to 11.75

CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel.	\$14.00 to \$14.50
No. 2 hvy. mtng. steel.	11.50 to 12.00
Scrap rails for mtng.	14.00 to 14.50
Loose sheet clippings.	8.50 to 9.00
Bundled sheets	10.50 to 11.00
Cast iron borings	6.50 to 7.00
Machine shop turn.	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	15.00 to 15.50
No. 1 locomotive tires.	12.50 to 13.00
Short rails	17.00 to 17.50
Cast iron carwheels.	13.50 to 14.00
No. 1 machinery cast.	14.00 to 14.50
No. 1 railroad cast.	13.50 to 14.00
Burnt cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Agricul. malleable	13.00 to 13.50
Railroad malleable	15.00 to 15.50

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel.	\$13.25 to \$13.75
No. 2 hvy. mtng. steel.	12.25 to 12.75
Borings and turnings.	9.00 to 9.50
Long turnings	\$8.50 to \$9.00
Short shov. turnings.	10.00 to 10.50
No. 1 machinery cast.	14.50 to 15.00
Automotive cast	14.50 to 15.00
Hydraul. comp. sheets.	14.00 to 14.50
Stove plate	8.50 to 9.00
New factory bushel	12.75 to 13.25
Old No. 2 busheling	8.25 to 8.75
Sheet clippings	10.00 to 10.50
Flashings	12.50 to 13.00
Low phos. plate scrap.	13.75 to 14.25

CANADA

Dealers' buying prices per gross ton:	
Toronto	
No. 1 hvy. mtng. steel.	\$10.75 to \$10.50
No. 2 hvy. mtng. steel.	9.75 to 9.25
Mixed dealers steel	7.75 to 7.75
Scrap pipe	6.75 to 6.50
Steel turnings	4.25 to 4.25
Cast iron turnings	4.75 to 4.50
Machinery cast	11.75 to 11.00
Dealers cast	10.75 to 10.00
Stove plate	7.25 to 6.75

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mtng. steel.	\$17.00 to \$17.50
Hydraulic bundles	16.50 to 17.00
Machine shop turn.	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel.	\$11.50 to \$12.00
No. 2 hvy. mtng. steel.	10.00 to 10.25
Hvy. breakable cast.	11.00 to 11.50
No. 1 machinery cast.	12.00 to 12.50
No. 2 cast	10.50 to 11.00
Stove plate	10.00 to 10.00
Steel car axles	16.00 to 17.00
Shafting	15.00 to 16.00
No. 1 RR. wrought	12.00 to 12.50
No. 1 wrought long.	11.00 to 11.50
Spec. iron & steel pipe	10.50 to 11.00
Forge fire	8.00 to 8.50
Rails for rolling	11.50 to 12.00
Short shov. turnings.	5.75 to 6.25
Machine shop turn.	6.25 to 6.50
Cast borings	6.25 to 6.50
No. 1 blast furnace.	5.00 to 5.50
Cast borings (chem.).	10.00 to 11.00
Unprepar. yard scrap.	6.50 to 7.00

Per gross ton, delivered local foundries:
No. 1 machn. cast. \$14.00 to \$14.50
No. 1 hvy. cast cupola. 11.50 to 12.00
No. 2 cast 10.50 to 11.00
Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel.	\$10.75 to \$11.00
Scrap rails	11.00 to 11.25
No. 2 steel	8.75 to 9.00
Breakable cast	10.00 to 10.25
Machine shop turn.	5.50 to 5.50
Bund. skeleton long.	9.50 to 9.50
Shafting	15.00 to 15.25
Cast bor. chemical.	6.00 to 7.00
Per gross ton delivered consumers' yards:	
Textile cast	\$12.00 to \$13.50
No. 1 machine cast	12.00 to 13.50
Stove plate	9.50 to 10.00

EXPORT

Brokers' buying prices per gross ton:

New York, delivered alongside barges	
No. 1 hvy. mtng. steel.	\$11.00 to \$11.00
No. 2 hvy. mtng. steel.	10.00 to 10.00
No. 2 cast	10.00 to 10.00
Stove plate	9.00 to 9.00
Rails (scrap)	\$10.75 to \$11.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 heavy melting steel.	\$12.00 to \$12.00
No. 2 heavy melting steel.	11.00 to 11.00
Rails (scrap)	12.50 to 12.50
Stove plate	7.75 to 7.75
Machine shop turn.	6.00 to 6.00
New Orleans, on cars at Stuyvesant Dock	
No. 1 hvy. mtng. steel.	\$12.60 to \$12.75
No. 2 hvy. mtng. steel.	11.60 to 11.75
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mtng. steel.	\$10.50 to \$11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton
Rerolling \$32.00
Forging quality 39.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open-hearth or Bessemer..... \$32.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.80c.

Wire Rods

(No. 5 to 15/32 in.)

Per Gross Ton
F.o.b. Pittsburgh or Cleveland. \$40.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 41.00
F.o.b. Worcester, Mass. 42.00
F.o.b. Birmingham 43.00
F.o.b. San Francisco 49.00
F.o.b. Galveston 46.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.
F.o.b. Pittsburgh 2.05c.
F.o.b. Chicago or Gary 2.10c.
F.o.b. Duluth 2.20c.
Del'd Detroit 2.20c.
F.o.b. Cleveland 2.10c.
F.o.b. Buffalo 2.15c.
Del'd Philadelphia 2.36c.
Del'd New York 2.40c.
F.o.b. Birmingham 2.20c.
F.o.b. cars dock Gulf ports... 2.45c.
F.o.b. cars Pacific ports..... 2.60c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 1.90c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 1.95c.
F.o.b. Buffalo 2.00c.
F.o.b. Birmingham 2.05c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports.. 2.45c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.05c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.10c.
Del'd Detroit 2.20c.
F.o.b. cars dock Gulf ports... 2.45c.
F.o.b. cars dock Pacific ports.. 2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 1.90c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 1.95c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports.. 2.30c.

Iron

F.o.b. Chicago 1.80c.
F.o.b. Pittsburgh (refined) ... 2.10c.
Delivered New York 2.05c.
Delivered Philadelphia 2.10c.

Cold Finished Bars and Shafting*

Base per Lb.
F.o.b. Pittsburgh 2.35c.
F.o.b. Cleveland, Chicago and Gary 2.40c.
F.o.b. Buffalo 2.45c.
Del'd Detroit 2.50c.
Del'd eastern Michigan 2.55c.

*In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.
F.o.b. Pittsburgh 1.90c.
F.o.b. Chicago or Gary 1.95c.
Del'd Cleveland 2.095c.
F.o.b. Coatesville or Spar. Pt. 2.00c.
Del'd Philadelphia 2.09c.
Del'd New York 2.19c.
F.o.b. Birmingham 2.05c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports.. 2.45c.
Wrought iron plates, f.o.b. Pittsburgh 3.20c.

Floor Plates

F.o.b. Pittsburgh 3.45c.
F.o.b. Chicago 3.50c.
F.o.b. Coatesville 3.55c.
F.o.b. cars dock Gulf ports... 3.85c.
F.o.b. cars dock Pacific ports.. 4.00c.

Structural Shapes

Base per Lb.
F.o.b. Pittsburgh 1.90c.
F.o.b. Chicago 1.95c.
Del'd Cleveland 2.095c.
F.o.b. Buffalo or Bethlehem... 2.00c.
Del'd Philadelphia 2.115c.
Del'd New York 2.1625c.
F.o.b. Birmingham (standard) 2.05c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports.. 2.45c.

Steel Sheet Piling

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago or Buffalo..... 2.35c.
F.o.b. cars dock Gulf or Pacific Coast ports 2.70c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb per gross ton.....\$36.37½
Angle bars, per 100 lb. 2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton \$35.00
Light rails (from rail steel) per gross ton 34.00

Base per 100 Lb.

Spikes 2.75c.
Tie plates, steel 2.00c.
Tie plates, Pacific Coast ports.. 2.10c.
Track bolts, to steam railroads. 3.75c.
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE,

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
No. 10, f.o.b. Pittsburgh 1.95c.
No. 10, f.o.b. Gary 2.05c.
No. 10, del'd Detroit 2.15c.
No. 10, del'd Philadelphia 2.26c.
No. 10, f.o.b. Birmingham 2.10c.
No. 10, f.o.b. cars dock Pacific ports 2.50c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 2.60c.
No. 24, f.o.b. Gary 2.70c.
No. 24, del'd Detroit 2.80c.
No. 24, del'd Philadelphia 2.91c.
No. 24, f.o.b. Birmingham 2.75c.
No. 24, f.o.b. cars dock Pacific ports 3.25c.
No. 24, wrought iron, Pittsburgh 4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh... 2.60c.
No. 10 gage, f.o.b. Gary 2.70c.
No. 10 gage, f.o.b. Detroit 2.80c.
No. 10 gage, del'd Philadelphia.. 2.91c.
No. 10 gage, f.o.b. Birmingham.. 2.75c.
No. 10 gage, f.o.b. cars dock Pacific ports 3.20c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh.. 3.05c.
No. 20 gage, f.o.b. Gary 3.15c.
No. 20 gage, del'd Detroit 3.25c.
No. 20 gage, del'd Philadelphia.. 3.36c.
No. 20 gage, f.o.b. Birmingham . 3.20c.
No. 20 f.o.b. cars dock Pacific ports 3.60c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh.. 3.20c.
No. 24, f.o.b. Gary 3.30c.
No. 24, del'd Philadelphia 3.51c.
No. 24, f.o.b. Birmingham 3.35c.
No. 24, f.o.b. cars dock Pacific ports 3.80c.
No. 24, wrought iron, Pittsburgh 4.95c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.
Field grade 3.00c.
Armature 3.35c.
Electrical 3.85c.
Special Motor 4.90c.
Special Dynamo 5.60c.
Transformer 6.10c.
Transformer Special 7.10c.
Transformer Extra Special.... 7.60c.
Silicon Strip in coils—Sheet price plus silicon sheet extra width extras, plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh 3.50c.
F.o.b. Gary 3.60c.
F.o.b. cars dock Pacific ports... 4.20c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh 3.05c.
No. 20, f.o.b. Gary 3.15c.
No. 20, f.o.b. Birmingham 3.65c.
No. 20, f.o.b. cars dock Pacific ports 3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh 2.75c.
No. 28, Gary 2.85c.
No. 28, cars dock Pacific ports. 3.35c.

Tin Plate

Base per Box
Standard cokes, f.o.b. Pittsburgh district mill \$5.25
Standard cokes, f.o.b. Gary..... 5.35

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$10.00
15-lb. coating I.C. 12.00
20-lb. coating I.C. 13.00
25-lb. coating I.C. 14.00
30-lb. coating I.C. 15.25
40-lb. coating I.C. 17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ in.

Base per Lb.
All widths up to 24 in., P'gh. 1.95c.
All widths up to 24 in., Chicago. 2.05c.
All widths up to 24 in., del'd Detroit 2.15c.
All widths up to 24 in., Birmingham 2.10c.
Cooperage stock, Pittsburgh... 2.05c.
Cooperage stock, Chicago..... 2.15c.

Cold-Rolled Strips*

Base per Lb.
F.o.b. Pittsburgh 2.60c.
F.o.b. Cleveland 2.60c.
Del'd Chicago 2.895c.
F.o.b. Worcester 2.80c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

Base per Lb.
Pittsburgh and Cleveland Worcester
Carbon 0.25-0.50% 2.60c. 2.80c.
Carbon .51-.75 3.70c. 3.90c.
Carbon .76-1.00 5.45c. 5.65c.
Carbon Over 1.00 7.50c. 7.70c.

Fender Stock

No. 14, Pittsburgh or Cleveland. 2.90c.
No. 14, Worcester 3.30c.
No. 20, Pittsburgh or Cleveland. 3.30c.
No. 20, Worcester 3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

Per Lb.

Bright wire 2.50c.
Spring wire 3.05c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

Base per Keg

Standard wire nails \$2.05
Smooth coated nails 2.05

Base per 100 Lb.

Annealed fence wire \$2.80
Galvanized fence wire 3.15
Polished staples 2.75
Galvanized staples 3.00
Barbed wire, galvanized 2.55
Twisted barbed wire 2.55
Woven wire fence, base column 60
Single loop bale ties, base column 52

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/4	57	3/4	37
1/4 to 3/4	60	1 1/4	44 1/2
1/2	64 1/2	1 1/2	55
3/4	67 1/2	1 3/4	59
1 to 3	69 1/2	2	61 1/2

Lap Weld

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
2	62	2 1/2	37
2 1/2 to 3	65	2 3/4 to 3 1/4	38
3 1/2 to 6	67 1/2	4 to 8	40
7 & 8	66 1/2	9 to 12	38
9 & 10	65 1/2		
11 & 12	64 1/2		

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/4	55 1/2	3/4	37
1/4 to 3/4	57 1/2	1 1/4	44 1/2
1/2	62 1/2	1 1/2	55
3/4	66 1/2	1 3/4	59
1 to 3	68	2	61 1/2

Lap Weld, extra strong, plain ends

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
2	60	2 1/2	37
2 1/2 to 3	64	2 3/4 to 3 1/4	38
3 1/2 to 6	67 1/2	4 to 8	40
7 & 8	66 1/2	9 to 12	38
9 & 10	65 1/2		
11 & 12	64 1/2		

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

In.	o.d.	13 B.W.G.	Cold Drawn	Hot Rolled
1	13 B.W.G.	13 B.W.G.	\$ 8.60	\$ 7.82
1 1/4	13 B.W.G.	13 B.W.G.	10.19	9.26
1 1/2	13 B.W.G.	13 B.W.G.	11.26	10.23
1 3/4	13 B.W.G.	13 B.W.G.	12.81	11.64
2	13 B.W.G.	13 B.W.G.	14.35	13.04
2 1/4	13 B.W.G.	13 B.W.G.	16.00	14.54
2 1/2	13 B.W.G.	13 B.W.G.	17.61	16.01
2 3/4	13 B.W.G.	13 B.W.G.	19.29	17.54
3	13 B.W.G.	13 B.W.G.	20.45	18.59

3 in. o.d.	12 B.W.G.	\$21.45	\$19.50
4 1/4 in. o.d.	10 B.W.G.	41.08	37.35
3 1/2 in. o.d.	11 B.W.G.	27.09	24.82
4 in. o.d.	10 B.W.G.	33.60	30.34
4 1/4 in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb. or ft.	to 39,999 lb. or ft.	5 %
12,000 lb. or ft.	to 24,999 lb. or ft.	12 1/2 %
6,000 lb. or ft.	to 11,999 lb. or ft.	25 %
2,000 lb. or ft.	to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.		50 %

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago, \$48.40
6-in. and larger, del'd New York 45.20
*6-in. and larger, Birmingham 40.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles... 48.00
F.o.b. dock, Seattle 40.50
F.o.b. dock, Seattle 51.50
Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

*Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$39. Birmingham, and \$47.40, delivered Chicago and 4-in. pipe, \$42, Birmingham, and \$50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
1/2 in. x 6 in. and smaller... 70 and 10
Larger than 1/2 in. 70 and 5
Lag bolts 70 and 5
Pilot bolts, Nos. 1, 2, 3, and 7
heads 70 and 5
Hot-pressed nuts, blank or tapped, square 70 and 5
Hot-pressed nuts, blank or tapped, hexagon 70 and 5
C.p.c. and t. square or hex. nuts, blank or tapped 70 and 5
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes
60, 20 and 10
Stove bolts in packages, nuts attached 75
Stove bolts in packages, with nuts separate 75 and 5
Stove bolts in bulk 82 1/2
Tire bolts 50 and 5

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland... \$3.05
F.o.b. Chicago or Birmingham... 3.15

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh 70 and 5
F.o.b. Cleveland 70 and 5
F.o.b. Chicago and Birm'g'm. 70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller 50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller 75
Milled headless set screws, cut thread 3/4 in. and smaller 75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller 60
Upset set screws, cup and oval points 75
Milled studs 65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$51 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base 2.55c.
Delivered price at Detroit is... 2.70c.

S.A.E. Alloy Series Differential Numbers per 100 lb.

2000 (1/2% Nickel)	.....	\$0.25
2100 (2 1/2% Nickel)	.....	0.95
2300 (3 1/2% Nickel)	.....	1.50
2500 (5% Nickel)	.....	2.25
3109 Nickel Chromium	.....	0.56
3200 Nickel Chromium	.....	1.35
3300 Nickel Chromium	.....	3.80
3400 Nickel Chromium	.....	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	.....	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	.....	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	.....	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	.....	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	.....	0.45
5100 Chromium Spring Steel	.....	base
6100 Chromium Vanadium Bar	.....	1.10c.
6100 Chromium Vanadium Spring Steel	.....	0.70
Chromium Nickel Vanadium	.....	1.40
Carbon Vanadium	.....	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric turned steel is 50c. higher. The differential for cold-drawn bars 1/4c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.05c. base per lb. Delivered Detroit, 3.20c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20 3/4c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

Base per Lb.

High speed	57 1/4c.
High carbon chrome	37c.
Oil hardening	21c.
Special	19c.
Extra	15 1/4c.
Regular	12 1/4c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports
Based on Exchange rate as of Oct. 6

Ferromanganese, export	.....	\$45.58
Billets, open-hearth	.....	29.74 to \$31.01
Tin plate, per base box	.....	4.74 to 4.84
Steel bars, open-hearth	.....	39.87
Beams, open-hearth	.....	38.61
Channels, open-hearth	.....	39.87
Angles, open-hearth	.....	38.61
Black sheets, No. 24 gage	.....	51.66
Galvanized sheets, No. 24 gage	.....	61.50

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports
Based on Exchange rate of Oct. 6

Billets, Thomas	.....	\$19.27
Wire rods, No. 5 B.W.G.	.....	36.90
Steel bars, merchant	.....	26.64
Sheet bars	.....	19.68
Plate, 1/4 in. and up	.....	35.42
Plate, 3/16 in. and 5 mm.	.....	34.85
Sheets, 1/4 in.	.....	36.90
Beams, Thomas	.....	25.58
Angles (Basic)	.....	25.58
Hoops and strip base	.....	32.79
Wire, plain, No. 8	.....	44.09
Wire nails	.....	47.15
Wire, barbed, 4 pt. No. 10 B.W.G.	.....	71.74

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.25c.
Structural shapes	3.25c.
Soft steel bars and small shapes	3.15c.
Reinforcing steel bars	3.15c.
Cold-finished and screw stock:	
Rounds and hexagons	3.60c.
Squares and flats	3.60c.
Hot-rolled strip incl. 3/16 in. thick, under 24 in. wide	3.30c.
Hoops	3.80c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.05c.
Hot-rolled sheets (No. 10)	3.05c.
Galv. corrug. sheets (No. 28) per square (more than 3750 lb.)	\$3.77
Spikes, large	3.25c.

Per Cent Off List

Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	\$3.65
Wire, black, soft ann'l'd, base per 100 lb.	3.05c.
Wire, galv. soft, base per 100 lb.	3.40c.
Common wire nails, per keg	2.30c.
Cement coated nails, per keg	2.30c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, rounds	3.20c.
Soft steel bars, squares and hexagons	3.35c.
Cold-fin. steel bars:	
Rounds and hexagons	3.75c.
Flats and squares	3.75c.
Hot-rolled strip	3.40c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	3.85c.
Track bolts (keg lots)	4.85c.
Rivets, structural (keg lots)	3.80c.
Rivets, boiler (keg lots)	3.90c.

Per Cent Off List

Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	60
Cut point set screws	75 and 10
Flat head bright wood screws	62 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	\$4.50 off list
Black ann'l'd wire per 100 lb.	\$3.95
Com. wire nails, 50 kegs or more	2.40c.†
Cement c't'd nails, 50 kegs or more	2.40c.†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.50c.
Structural shapes	3.47c.
Soft steel bars, rounds	3.51c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.06c.
Flats and squares	4.06c.
Cold-rolled: strip, soft and quarter hard	3.36c.

Hoops	3.66c.
Bands	3.66c.
Hot-rolled sheets (No. 10)	3.15c. to 3.41c.
Hot-rolled ann'l'd sheets (No. 24*)	3.75c. to 4.10c.
Galvanized sheets (No. 24*)	4.10c. to 4.50c.
Long terne sheets (No. 24)	5.25c. to 5.35c.
Armco iron, galv. (No. 24†)	5.65c.
Toncan iron, galv. (No. 24†)	5.65c.
Galvannealed (No. 24†)	5.75c.
Armco iron, hot-rolled annealed (No. 24†)	5.10c.
Toncan iron, hot-rolled annealed (No. 24†)	5.10c.
Armco iron hot-rolled (No. 10†)	4.15c.
Toncan iron, hot-rolled (No. 10†)	4.15c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.65c.
Deep drawing	5.40c.
Stretcher leveled	5.40c.
SAE, 2300, hot-rolled	6.97c.
SAE, 3100, hot-rolled	5.37c.
SAE, 6100, hot-rolled, annealed	9.57c.
SAE, 2300, cold-rolled	8.03c.
SAE, 3100, cold-rolled, annealed	7.43c.
Floor plate ¼ in. and heavier	5.30c.
Standard tool steel	11.25c.
Wire, black annealed (No. 9)	3.50c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x ½ in. and larger	3.85c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	\$3.21

Per Cent Off List

Machine bolts, square head and nut:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10
*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	
†125 lb. and more.	

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.55c.
Bars, soft steel (rounds and flats)	3.45c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.60c.
Cold-fin. rounds, shafting, screw stock	4.00c.
Hot-rolled annealed sheets (No. 24)	4.30c.
Galv. sheets (No. 24)	4.90c.
Hot-rolled sheets (No. 10)	3.40c.
Black corrug. sheets (No. 24)	4.30c.
*Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.25c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.10c.
*Structural shapes	3.10c.
*Soft steel bars, small shapes, iron bars (except bands)	3.25c.
†Reinforc. steel bars, sq. twisted and deformed	3.01c.
Cold-finished steel bars	4.01c.
*Steel hoops	3.55c.
*Steel bands, No. 12 and 3/16 in. incl.	3.30c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.50c.
*Hot-rolled annealed sheets (No. 10)	3.20c.
Diam. pat. floor plates, ¼ in.	5.05c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.41c.
Soft steel bars	3.10c.
†Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.75c.
Flat-rolled steel under ¼ in.	3.46c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.21c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.46c.
*Black ann'l'd wire, per 100 lb.	\$2.80
*No. 9 galv. wire, per 100 lb.	3.15
*Com. wire nails, base per keg	2.25

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.52c.
Floor plates	5.27c.
Bars, rounds, flats and angles	3.42c.
Other shapes	3.57c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.57c.
Cold-finished bars	3.97c.
Hot-rolled annealed sheets (No. 24) 25 bundles or more	3.72c.
Galv. sheets (No. 24) 3750 lb. or more	4.07c.
Galvanized sheets (No. 24) over 3500 lb.	4.07c.
Hot-rolled sheets (No. 10)	3.32c.
Structural rivets	4.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg: Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.48c.
Struc. shapes	3.35c.
Soft steel bars	3.25c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.80c.
Rounds and hex.	3.80c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.26c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.53c.
Galv. sheet (No. 24)	4.80c.
Bands	3.53c.
Hoops	3.53c.
Heavy top-rolled sheets	3.28c.
Com. wire nails, base per keg	\$2.85
Black wire, base per 100 lb. (2500-lb. lots or under)	4.00
(Over 2500 lb.)	3.90

BOSTON

	Base per Lb.
Channels, angles	3.65c.
Tees and zeos, under 3"	3.90c.
H beams and shapes	3.64c.
Plates—Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.66c.
Floor plates, diamond pattern	5.46c.
Bar and bar shapes (mild steel)	3.65c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.75c. to 4.75c.
Half rounds, half ovals, ovals and bevels	4.90c.
Tire steel	4.90c.
Cold-rolled strip steel	2.45c.
Cold-finished rounds, squares and hexagons	4.15c.
Cold-finished flats	4.10c.
Blue annealed sheets, No. 10 ga.	3.75c.
One pass cold-rolled sheets No. 24 ga.	4.30c.
Galvanized steel sheets, No. 24 ga.	4.30c.
Lead coated sheets, No. 24 ga.	5.95c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.29c.
Structural shapes	3.52c.
Plates	3.52c.
Floor plates	5.27c.
Hot-rolled annealed sheets (No. 24)*	4.14c.
Hot-rolled sheets (No. 10)** ..	3.24c.
Galvanized sheets (No. 24)....	4.82c.
Bands	3.49c.
Hoops	3.49c.
†Cold-finished bars	3.84c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.44c.
Bolts and nuts, in cases, 70 and 10 per cent off list	
Broken cases .65 and 10 per cent off	

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

*Base less 0.25c., 3500 lb. and over. Add 0.50c. per hundred lb. for broken bundles.

**Base less 0.25c., 1500 to 3749 lbs.; less 0.50c., 3750 to 7499 lb.; less 0.75c., 7500 lb. and over.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

Country territory to be equalized on the Chicago plan.

MILWAUKEE

Base per Lb.

Plates and structural shapes..	3.41c.
Soft steel bars, rounds up to 8 in., flats and fillet angles....	3.31c.
Soft steel bars, squares and hexagons	3.46c.
Hot-rolled strip	3.51c.
Hot-rolled sheets (No. 10)....	3.26c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Galvanized sheets (No. 20) ..	4.76c.
Cold-finished steel bars.....	3.76c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)...	4.01c.
Boiler rivets, cone head (keg lots)	4.11c.
Track spikes (keg lots)	4.06c.
Track bolts (keg lots)	5.06c.
Black annealed wire	3.40c.
Com. wire nails	2.60c.
Cement coated nails	2.60c.

Per Cent Off List

Machine bolts carriage bolts and lag screws	70 to 75
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots).....	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	3.45c.
Structural shapes	3.55c.
Plates	3.55c.
Cold-finished bars	4.00c.
Bands and hoops	3.65c.
Hot-rolled annealed sheets, No. 24	4.30c.
Galvanized sheets, No. 24.....	4.90c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

Base per Lb.

Mild steel bars and small shapes	3.20c.
Structural shapes	3.10c.
Reinforcing bars	prices on application
Plates	3.10c.
Hot-rolled sheets, No. 10.....	3.20c.
Bands	3.30c.
Hoops	3.55c.
Special threading steel	3.20c.
Diamond pattern floor plates ¼ in. and heavier	5.10c.
Galvanized bars and small shapes	5.70c.
Galvanized bands	5.80c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	3.88c.

All prices are for 2000 lb. and more. For second zone add 10c. per 100 lb. for trucking.

List size extras of Aug. 15, 1935, and cutting extras to be added.

For cold-rolled products, list size extras from Jan. 1, 1936, and cutting extras to be added.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.46c.
Iron bars	3.46c.
Reinforcing bars	3.46c.
Structural shapes	3.66c.
Plates	3.66c.
Hot-rolled sheets No. 10	3.46c.
Hot-rolled annealed sheets, No. 24*	3.41c.
Galvanized sheets No. 24*....	3.96c.
Steel bands	3.71c.
Cold-finished bars	4.281c.

* Plus mill item extra.

MEMPHIS

Base per Lb.

Mild steel bars	3.57c.
Shapes, bar size	3.57c.
Iron bars	3.57c.
Structural shapes	3.77c.
Plates	3.77c.
Hot-rolled sheets, No. 10.....	3.57c.
Hot-rolled annealed sheets, No. 24	4.37c.
Galvanized sheets, No. 24....	5.07c.
Steel bands	3.82c.
Cold-drawn rounds	4.04c.
Cold-drawn flats, squares, hexagons	6.04c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

Base per Lb.

Mild steel bars	3.45c.
Reinforcing bars	3.50c.
Structural shapes	3.65c.
Plates	3.65c.
Hot-rolled sheets, No. 10.....	3.65c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24....	4.95c.
Steel bands	4.05c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	\$2.45
Bolts and nuts, per cent off list	70

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.60c.	3.80c.	3.65c.
Shapes, standard	3.60c.	3.80c.	3.65c.
Soft steel bars..	3.60c.	3.80c.	3.90c.
Reinforcing bars, f.o.b. cars dock Pacific ports..	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.30c.	4.35c.	4.60c.
Hot-rolled sheets (No. 10)	3.70c.	3.90c.	3.85c.
Galv. sheets (No. 24 and lighter)	5.00c.	4.60c.	5.00c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.80c.	5.00c.
Cold finished steel			
Rounds	6.05c.	6.10c.	6.00c.
Squares and hexagons ..	7.30c.	7.35c.	6.35c.
Flats	7.80c.	7.85c.	7.35c.
Common wire nails—base per keg less carload	\$2.90	\$2.90	\$2.90

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$45.00
High-heat duty, New Jersey...	50.00
High-heat duty, Ohio	40.00
Intermediate, Pennsylvania, Maryland, Kentucky, Mis- souri and Illinois	40.00
Intermediate, New Jersey.....	43.00
Intermediate, Ohio	35.00
Ground fire clay, per ton	7.00

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$45.00
Chicago District	54.00
Birmingham	\$48 to 50.00
Silica cement per net ton	8.00

Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plym- outh Meeting and Chester....	\$45.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Chester, Pa.	\$65.00
Chemically bonded, f.o.b. Balti- more	55.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$21.50
F.o.b. Bethlehem, Birdsboro, and Swedeland, Pa., and Sparrows Point, Md.	20.50
Delivered Brooklyn	22.9289
Delivered Newark or Jersey City	21.9873
Delivered Philadelphia	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.50
F.o.b. Jackson, Ohio	21.25
Delivered Cincinnati	19.82
F.o.b. Duluth	20.00
F.o.b. Provo, Utah	17.50
Delivered San Francisco, Los Angeles or Seattle	22.315
F.o.b. Birmingham*	15.88

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$21.00
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	20.00
F.o.b. Buffalo	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.00
Delivered Cincinnati	18.82
Delivered Canton, Ohio	20.3482
Delivered Mansfield, Ohio	20.8832
F.o.b. Jackson, Ohio	20.75
F.o.b. Provo, Utah	17.00
F.o.b. Birmingham	14.50

Bessemer

F.o.b. Everett, Mass.	\$22.50
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	21.50
Delivered Boston Switching District	23.00
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia	22.3132
F.o.b. Buffalo and Erie, Pa., and Duluth	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	20.00
F.o.b. Birmingham	21.00
Delivered Cincinnati	21.0807
Delivered Canton, Ohio	21.3482
Delivered Mansfield, Ohio	21.8232

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$24.00
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Gray Forge

Valley or Pittsburgh furnace	\$19.00
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Charcoal

Lake Superior furnace	\$22.50
Delivered Chicago	25.7528

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	\$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	Per Gross Ton
Domestic, 80% (carload)	\$75.00
Spiegeleisen	
Per Gross Ton Furnace	
Domestic, 19 to 21%	\$26.00
50-ton lots 3-mo. shipment ..	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 6.00 to 6.50%	\$22.75
For each additional 0.5% silicon up to 17%. 50c. a ton is added.	

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	
10.00 to 10.50%	\$27.75
10.51 to 11.00%	28.25
11.01 to 11.50%	28.75
11.51 to 12.00%	29.25
12.01 to 12.50%	29.75
12.51 to 13.00%	30.25
13.01 to 13.50%	30.75
13.51 to 14.00%	31.25
14.01 to 14.50%	31.75
14.51 to 15.00%	32.25
15.01 to 15.50%	32.75
15.51 to 16.00%	33.25
16.01 to 16.50%	33.75
16.51 to 17.00%	34.25

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads	\$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up. 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$38.00
Ton lots or less, per ton.	43.00
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports	Per Gross Ton
Old range, Bessemer, 51.50% ..	\$4.30
Old range, non-Bessemer, 51.50% ..	4.65
Mesabi, Bessemer, 51.50%	4.65
Mesabi, non-Bessemer, 51.50% ..	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore	Per Unit
Iron, low phos., copper free, 55 to 58% dry Algeria	13.00c.
Iron, low phos., Swedish, average, 68 1/2% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	10.00c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52% ..	27c.
Man., African, Indian, 44-48% ..	25c.
Man., African, Indian, 49-51% ..	27.00c.
Man., Brazilian, 46 to 48 1/2% ..	Nominal 25c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$15.25 to \$15.50
Tungsten, domestic, scheelite delivered, nominal	15.00
Per Gross Ton	
Chrome, 45% Cr ₂ O ₃ , lamp, c.i.f. Atlantic Seaboard (African) ..	\$17.50
45 to 46% Cr ₂ O ₃ (Turkish) ..	\$16.50 to 17.00
48% Cr ₂ O ₃ (African)	20.50
48% min. Cr ₂ O ₃ (Turkish)	19.25
Chrome concentrate, 50% and over Cr ₂ O ₃ , c.i.f. Atlantic ports ..	22.00
52% Cr ₂ O ₃ (Turkish)	21.75
48 to 49% Cr ₂ O ₃ (Turkish) ..	19.25

FLUORSPAR

Per Net Ton	
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$18.00
Domestic, barge and rail	18.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	19.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	22.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.	
F.o.b. Bayonne or Baltimore No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial ..	5.00c.
Del'd Ch'go, No. 5 industrial ..	3.77c.
Del'd Cleve'd, No. 3 distillate ..	6.00c.
Del'd Cleve'd, No. 4 industrial ..	5.75c.
Del'd Cleve'd No. 5 industrial ..	5.00c.

COKE AND COAL

Coke

Per Net Ton	
Furnace, f.o.b. Connells-ville, Prompt	\$3.75 to \$4.00
Foundry, f.o.b. Connells-ville, Prompt	4.25 to 5.75
Foundry, by - product, Chicago ovens	9.00
Foundry, by - product, del'd New England	11.50
Foundry, by - product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by - product, Philadelphia	9.38
Foundry, by - product, delivered Cleveland ..	10.30
Foundry, by - product, delivered Cincinnati ..	9.50
Foundry, Birmingham ..	6.50
Foundry, by - product, St. Louis, f.o.b. ovens ..	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, 1/4-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

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Zinc-Alloy Die Castings

(CONCLUDED FROM PAGE 37)

and subsequently put through centerless grinders after other machining operations. Pistons of hour-glass shape for use in master cylinders of hydraulic braking systems are being produced in large quantities and in multiple-cavity dies from copper-base alloys by die casting or "pressure casting" as it is sometimes termed. These pistons are high in corrosion resistance and the method of production represents a considerable saving in

metal over sand casting or machining from rod stock.

Applied finishes on die castings appear not to have undergone any material change. Exposed parts are nearly all plated with nickel (in some cases with a heavy plating of copper initially) and finally with chromium, but Ford is continuing the use of the Macoid (dipped nitrocellulose) finish for interior hardware. Most of the unexposed die castings do not require or receive any finish, but some of those of zinc alloy used in carburetors are given the Cronak finish by dipping in a dichromate solution, which materially increases corrosion resistance.

This Week on the Assembly Line

(CONCLUDED FROM PAGE 57)

assemblies a day. Studebaker reports 12,152 passenger cars and trucks sold during October, as compared with 1860 in October, 1935. Sales for the first 10 months were 75,451, compared with 41,430 during the comparable period in 1935, a gain of 82 per cent.

Buick set its goal for 1937 at 240,000 cars, but at the present rate this figure is likely to be exceeded. In September, Packard budgeted 133,000 units for the model year, but already the company is spending \$2,000,000 for increased manufacturing facilities, including equipment for a transmission line and the front wheel suspension. This is in addition to the \$5,120,000 previously spent for the 1937 program. Chrysler, in passing out its third employee bonus for the year, amounting to \$4,000,000, announced that so far it has sold more cars and trucks than ever sold before in a whole year. The corporation was early in getting into production on 1937 models and is anticipating a high volume of business for the balance of the year.

Employment is up in all factories and the index of industrial employment for Detroit now stands at 103, up from a low point of 75.7 on Sept. 15 and almost equal to the January, 1936, high of 109.7. Packard is now employing 11,500 men, considerably more than double the average employment during all of 1934. As the shows open, therefore, Detroit is looking forward to an exceedingly prosperous season.

Automobile production for the week ended Nov. 7 is estimated at 84,780 passenger cars and trucks in the United States and Canada, compared with 71,095 last week and 98,615 in the corresponding period a year ago, according to Ward's Automotive Reports. Of this amount, 39,620 units are credited to General Motors, Chevrolet accounting for 26,500. Chrysler divisions produced 24,050, approximately half of which were Plymouths. Ford's volume was 6700. With Ford building up production rapidly, the figure is likely to reach the 100,000 mark for this current week and the indication is that the industry will hold this pace at least until the end of the year. On this basis it is reasonable to expect that November production will run over 400,000 units, somewhat less than last year's total of 411,520 because of Ford's late start.

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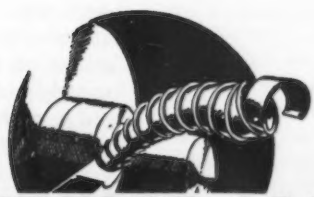
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THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... Markets have thrown off pre-election lethargy and are fairly active.

o o o

... October business generally better than that of September.

o o o

... Railroad shop to replace equipment ranging in age from 24 to 49 years.

New York

ALTHOUGH some machine tool sellers are perturbed by the possibility of further Government interference in their business, particularly as the Walsh-Healey Act may affect them, the trade as a whole reports that business is good and that nothing is in sight to indicate a change. One large dealer can ship practically none of the many varied machine tools he handles in less than eight weeks, while in some products, deliveries into May, 1937, are being quoted. Shearing machines require from three to four months for delivery, and the backlog shows no signs of lessening. Orders taken in since the election are sufficient to prove that users of that type machine have no fear of the future, and since most of them represent heavy industries, it may in some small way also be taken as a sign that that class of business is not worried over immediate prospects.

Detroit

OCTOBER proved to be a better month in sales than had been anticipated, although most attention was devoted to servicing the equipment recently installed in automobile plants. With automotive sales above earlier optimistic anticipations, many companies are now considering increases in capacity, ranging from 10 to 15 per cent, which will necessitate the purchase of machinery to bolster up the weak points of the lines. Packard's purchase of equipment for making its front wheel suspension and also for increasing the output of its transmission line is an example of the type of buying that is expected to feature the market in the next month. There has also been a small amount of buying on the part of some of the jobbing shops of toolroom equipment.

Cincinnati

THE district machine tool market was more active the past week than during the preceding period, despite the intervention of Election Day. Manufacturers report October business to have been better than that of September. Current ordering shows no deviation from the October pace. Large orders are few, the current market being supported by a steady flow of one or two unit requisitions. Inquiry is holding up. Production is steady at about 70 per cent, and manufacturers are extending themselves to insure deliveries.

Pittsburgh

THE exceptionally heavy rate of inquiries prevalent over the past few weeks has shown further increase within the last few days. Pre-election lethargy has now disappeared, and some customers have telephoned in to this district for dealers to go ahead with orders on which data were given some time ago. Meanwhile, the volume of orders being received is satisfactory, and dealers are optimistic concerning the remainder of the year. The Moore Dry Dock Co., Oakland, Cal., has placed an order with the Thomas Spacing Machine Co., Pittsburgh, for eight large tools for its new structural shop. The order involves large multiple punches and automatic spacing tables, various shears, a plate duplicator, and other production tools of the most modern type.

Cleveland

WHILE machine tool sales with most manufacturers are holding to good volume, orders and live inquiries in this district are light. A quiet market is expected during the remainder of the year. Some buyers have made inquiry for quotations on

machines for use in preparing their 1937 budgets, indicating possible purchases of new equipment early in the year. Others state that they will not buy any more equipment this year. Some that might buy new machines in the next few weeks state that their 1936 budgets are exhausted. Demand for good used machinery is active, but the supply is not plentiful.

Chicago

BUSINESS held up by the election is beginning to free itself, and most dealers report higher sales of miscellaneous and scattered machine tools. Here and there deliveries are being pushed further into the future and, if current inquiries develop into sales, shipments will be still further delayed. Lists are lacking, though railroad budget work points to large inquiries from that direction. Allis-Chalmers Mfg. Co. is slowly placing formal orders for equipment for its Springfield, Ill., plant extension.

St. Louis

THE newest piece of heavy-duty machinery which the St. Louis-Southwestern Railway has asked the United States District Court at St. Louis for authority to replace with new units was purchased in 1912, 24 years ago, and the oldest in 1887, 49 years ago. The story of the service the railroad obtained from its machinery, and the necessity for replacement now with new units, is told in the application of the trustee for the railroad.

"A large portion of the locomotive maintenance machinery in the shops at Pine Bluff, Ark., is worn out and obsolete, and in order more efficiently and economically to perform the regular shop repair work on locomotives, it is necessary to replace said machinery with the following heavy-duty shop machinery:

One 8-in. hollow spindle turret lathe at a cost of \$12,338, to replace turret lathe purchased in 1912; one vertical boring mill at a cost of \$10,475, to replace a machine purchased in 1909; one 24 in. x 8 ft. engine lathe at a cost of \$6,500, to replace one purchased in 1892 and another purchased in 1887; one 90-in. driving wheel lathe at a cost of \$33,800, to replace a wheel lathe of light pattern purchased in 1910, and which is not capable of handling wheels of modern locomotives; one 800-ton wheel press at a cost of \$8,250, to replace a 400-ton wheel press purchased in 1909 and which is inadequate for handling wheels of modern locomotives; one No. 5 milling machine at a cost of \$8,400, required because of the increase in the amount of milling machine work, and to replace a planer purchased in 1909; one 54 x 60 in. x 18 ft. planer at a cost of \$24,750, which will replace a planer purchased in 1887; one 6-ft. radial drill at a cost of \$8,769, to replace a machine purchased in 1912; one 18 in. x 8 ft. lathe at a cost of \$3,700, to replace a lathe purchased in 1895; one vertical milling machine at a cost of \$5,000, to replace a second-hand machine purchased in 1913; one 32-in. shaper at a cost of \$3,750, to replace a machine purchased in 1912; one oxygraph at a cost of \$2,500.

Advanced Machine Tool Applications at Packard

(CONTINUED FROM PAGE 33)

double-end planetary machine. Both the straddle milling cutters and the oil groove cutters are tungsten-carbide tipped. The same material is also used on the four-bladed cutters on the following

semi-finish boring operation on the cylinder barrels in an Ingersoll machine. Later on, the finish reaming of the cylinder bores and chamfering of the top is performed in a similar Ingersoll machine, ex-

cept that high-speed steel blades are used in the cutters. Other operations in between include the inspection and assembly of the Welch plugs, water testing, pressing in of valve guide bushings with an Oil-gear 25-ton hydraulic press and finish reaming of the valve guide bushings and the valve throats in a pair of Moline drilling machines.

The cylinder bores are honed following the reaming operation in two steps in a pair of Barnes honing machines carrying Micromatic hones. This completes the operation on the block, with the exception of chamfering and grinding the valve seats with portable electric tools.

Except for the two broaching operations, production on the 120 block and on the Six are carried on independently. In fact, the 120 progresses down the line installed last year and described in *THE IRON AGE* of Nov. 21, 1935, pages 30 and 31.

Another Packard "first-to-use" is found in the crankshaft line where in a single set-up rough and finish turning operations on the main bearings are combined through the use of a special broaching head. It eliminates a rough grinding operation. This 41,000-lb. machine is a standard Wickes automatic center-drive crankshaft lathe to which has been attached a vertical broaching slide. To prepare the rough forging for this lathe, the crankshaft is centered at both ends and locating and driving pads are milled on the two crankarms adjacent to the two center main bearings. This is done in a special Producto-Matic triple-head miller. These pads serve as chucking points in the center drive and they locate the crankshaft in correct alinement. Deflection is thus prevented during the machining operations.

Both front and rear lathe tools are mounted on hydraulically-actuated carriages and the rear tools are carried on inverted cross-slides to resist the upward thrust of the tools. After rapid traversing to the cutting position, the tools slow down to the coarse cheeking feed, then to fine turning before reaching the diameter stop at which they dwell for five or six revolutions in order to clean up the cut. Upon rapid return of the lathe tools, the operator depresses the start button for the finish broaching cycle, which is completely automatic, in-

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cluding rapid approach, feed and rapid reverse. The main bail or head is first lowered for support of the four broaching tools which are then fed downward for the cutting cycle. The entire broaching bail is then fed horizontally 0.035 in. at right angles to the main spindle and this cross movement provides the feed of the broach from one tooth to the next as it ascends. The spindle is speeded up during cut.

Principal advantages of the combination machine are inherent accuracy in a single set-up, savings in floor space and wired horsepower, accuracy of the broaching operation and the great number of pieces machined for each sharpening of the broaches.

The crankpins are turned in the usual way in the latest type Le-Blond crankpin lathe.

Another interesting machine in the crankshaft line is a 2-way Natco multiple drilling, reaming and tapping unit which performs all this work in the flange and in the ends of the crankshaft following the grinding operations. A six-station trunnion-type fixture is employed, hand indexed and locked by shot bolts. There are 26 drilling and seven tapping spindles all told on the two hydraulic heads. A $\frac{3}{4}$ -in. tapped hole in the front end of the shaft is drilled in two stages, countersunk and reamed before being tapped in the sixth station, all by the left-hand head. The right-hand head performs similar operations on six holes in the flange and also bores and finishes the clutch pilot hole. Because of the length and weight of the crankshaft an unusually heavy fixture is necessary. Output is 55 cranks an hour at 80 per cent efficiency. All crankshaft operations are unusually severe since heat treatment takes place before any machining operations occur. This leaves the shaft in a hard, tough condition, necessitating heavy cutter loads.

Japan to Refine Iron Sand Commercially

TOKIO, Japan (Special Correspondence)—A new metallurgical process to refine iron sand on a commercial basis is reported to have been developed by Dr. Keizo Iwase, professor at Tohoku Imperial University, Sendai, Japan. It will be experimented in a sepa-

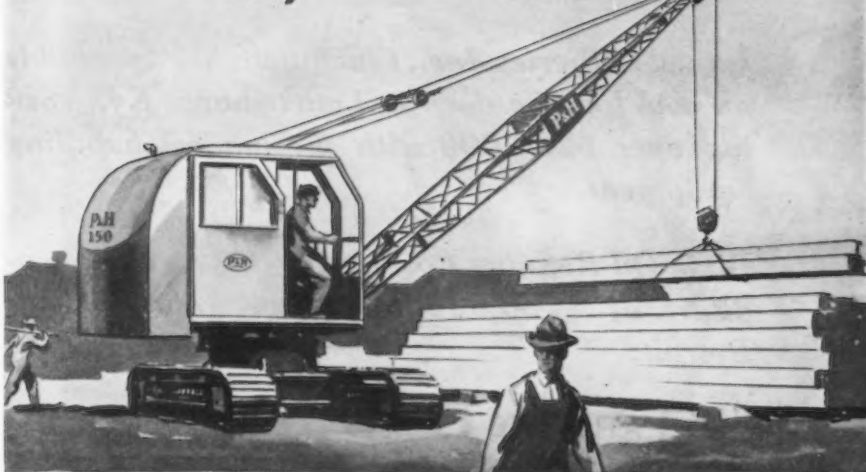
rate laboratory to be built at Sendai by the Commerce and Industry Ministry, and, if the experimentation proves successful, the process will be practiced on a large scale by the Tohoku Industrial Development Co., which was established by special law at the last Diet session.

The process is said to be comparable to that one which is utilized successfully by the Nippon Iron Sand Engineering Co.

According to the information available here, Dr. Iwase obtains

sponge iron by the usual methods and refines the sponge iron with manganese and chromium in a special electric furnace designed by him; then iron, manganese-chromium steel and ilmenite may be produced separately at the same time. He developed a smoke-screen solution from the titanium chloride, produced from the ilmenite, by adding chlorides of tin and ammonium. The smoke-screen is reported to evaporate and spread under chilly temperature, even at 60 deg. below zero.

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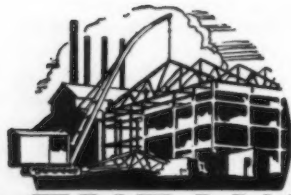
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PLANT EXPANSION AND EQUIPMENT BUYING

... *Continental Oil Co., New York, plans carbon black manufacturing plant near Dumas, Tex., to cost \$1,000,000.*

... *United Collieries, Inc., Cincinnati, has asked bids on coal loading dock at Catlettsburg, Ky., costing over \$200,000 with mechanical handling equipment.*

... *Dixie Oil Refining Co., Detroit, plans an expenditure of \$750,000 for an oil refinery near Detroit.*

◀ NORTH ATLANTIC ▶

Peerless Ice Machine Co., 43-06 Thirty-sixth Street, Long Island City, N. Y., manufacturer of ice and refrigerating machinery, has leased about 50,000 sq. ft. in four-story building at 43-20 Thirty-fourth Street, for plant.

Continental Can Co., 100 East Forty-second Street, New York, is acquiring property at Tampa, Fla., for new branch plant. Cost over \$100,000 with equipment.

Swift & Co., Union Stock Yards, Chicago, has asked bids on general contract for new two-story and basement plant, 115 x 225 ft., at Newburgh, N. Y., for commercial fertilizer division. Cost over \$80,000 with equipment.

Continental Oil Co., 60 East Forty-second Street, New York, has plans for carbon black manufacturing plant near Dumas, Moore County, Tex., with compressor plant, power house and other mechanical departments. Cost close to \$1,000,000 with machinery. Shamrock Oil & Gas Co., Tulsa, Okla., is interested in project and will be active in construction and operation.

New York Central Railroad Co., 466 Lexington Avenue, New York, will take bids at once for one-story machine shop at car maintenance and repair works at Ashtabula, Ohio. Cost about \$40,000 with equipment. J. W. Pfau is chief engineer.

American Can Co., 230 Park Avenue, New York, will take bids soon on general contract for two-story factory branch, storage and distributing plant at Brownsville, Tex., 80 x 175 ft. Cost over \$85,000 with equipment.

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until Nov. 23 for 240 electric motor-driven flasher mechanisms to control flash and eclipse characteristics of lights on beacons or buoys (Proposal 52487).

United States Bronze Powder Works, Inc., 220 West Forty-second Street, New York, has let general contract to Potterson Brothers, 215 West Twenty-eighth Street, for new two and three-story plant at Closter, N. J. Cost over \$85,000 with equipment.

Bronx Casket Mfg. Co., 853 East 221st Street, New York, has acquired former silk

mill of Belding-Heminway-Corticelli, Inc., at 4283 Park Avenue and will remodel for plant.

Bureau of Highways, Borough of Queens, 21-10 Forty-ninth Avenue, Long Island City, N. Y., plans equipment storage and distributing plant, asphalt plant, with diesel engine-electric power station and other works buildings at Flushing, L. I. Cost over \$400,000 with equipment.

National Biscuit Co., 449 West Fourteenth Street, New York, has filed plans for extensions and improvements in six and eight-story baking, storage and distributing plant. Cost about \$50,000. Louis Wirsching, Jr., is company architect, address noted.

Board of Education, Andes, N. Y., plans manual training department in new two-story high and grade school, Central School District No. 2, for which bids will be asked soon on general contract. Cost about \$150,000. Financing has been arranged through Federal aid. H. O. Fullerton, 152 Washington Avenue, Albany, N. Y., is architect.

Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., Willett Street, Passaic, N. J., plans multi-story addition to local plant. Cost close to \$100,000 with equipment.

Automatic Winding Co., 259 West Fourteenth Street, New York, manufacturer of radio and electrical equipment, has leased about 40,000 sq. ft. in buildings Nos. 21 and 22 at former mill of Clark Thread Co., East Newark, N. J., and will improve for new plant, providing facilities for initial working force of about 350 persons.

Reynolds Spring Co., West Michigan Avenue, Jackson, Mich., has leased former textile mill of Brighton Mills, Inc., Passaic, N. J., totaling about 270,000 sq. ft. floor space, and will remodel for main Eastern branch plant. Facilities will be installed for initial working force of about 1000 persons.

Keystone Brewing Co., Scranton, Pa., has approved plans for expansion, including installation of new mechanical-bottling department. Cost close to \$45,000 with machinery.

H. J. Heinz Co., 1062 Progress Street, Pittsburgh, has acquired 36,000 sq. ft. at D Street and Erie Avenue, Philadelphia, as site for new two-story factory branch.

storage and distributing plant. Cost over \$50,000 with equipment.

Hamilton Watch Co., Lancaster, Pa., has plans for four-story addition, about 45,000 sq. ft. floor space, for which superstructure will begin soon. Cost over \$100,000 with equipment. Prack & Prack, Martin Building, Pittsburgh, are architects.

Schraegle Engineering Co., Elizabeth, N. J., engineer and machinist, recently organized, has leased building at 818-822 Livingston Street for plant. A. F. Schraegle is president, and J. R. Sauerbrunn, treasurer.

◀ NEW ENGLAND ▶

Sprague Meter Co., South Street and Railroad Avenue, Bridgeport, Conn., manufacturer of gas meters and parts, has asked bids on general contract for two two-story additions, 66 x 85 ft., and 30 x 30 ft., and improvements in present plant. First noted unit will be used for expansion in manufacturing division and smaller structure for office. Cost over \$65,000 with equipment. Leo F. Caproni, New Haven, Conn., is architect and engineer.

Plainville Casting Co., Plainville, Conn., manufacturer of gray iron castings, has let general contract to Torrington Building Co., Torrington, Conn., for one-story addition, 50 x 120 ft. Cost close to \$50,000 with equipment.

Board of School Trustees, Wellesley, Mass., plans vocational training department in new three-story and basement high school, for which bids will be asked soon on general contract. Cost about \$700,000. Perry, Shaw & Hepburn, 141 Milk Street, Boston, are architects; Richardson & Day, 12 Pearl Street, Boston, are engineers.

Tilo Roofing Co., Stratford, Conn., has let general contract to Shaughnessy Construction Co., 886 Main Street, Bridgeport, Conn., for one and two-story addition, 100 x 160 ft. Cost close to \$75,000 with equipment. Fletcher-Thompson, Inc., Fairfield, Conn., is architect and engineer.

Cape Ann Anchor Works, Gloucester, Mass., manufacturer of iron ship anchors, plans rebuilding part of plant recently destroyed by fire. Loss over \$40,000 with equipment.

L. L. Brown Paper Co., Adams, Mass., operating Greylock Paper Mills, has let general contract to Fred T. Ley & Co., Inc., 1215 Main Street, Springfield, Mass., for one-story addition and improvements in present mill. Cost over \$50,000 with equipment.

◀ BUFFALO DISTRICT ▶

Morrison Machine Products Co., 1418 College Avenue, Elmira, N. Y., manufacturer of tools for automatic screw machines, collets, etc., has plans for one-story addition, 50 x 220 ft. Cost close to \$65,000 with equipment. Haskell & Conidine, Hulett Building, are architects.

New York State Electric & Gas Corp., Ithaca, N. Y., plans transmission and distributing lines for rural electrification, totaling close to 200 miles, with power substation and service facilities. Cost about \$250,000. Fund has been authorized to be secured through financing now under way.

Armour & Co., Union Stock Yards, Chicago, have asked bids on general contract for two-story branch plant at Rochester, N. Y. Cost over \$50,000 with equipment.

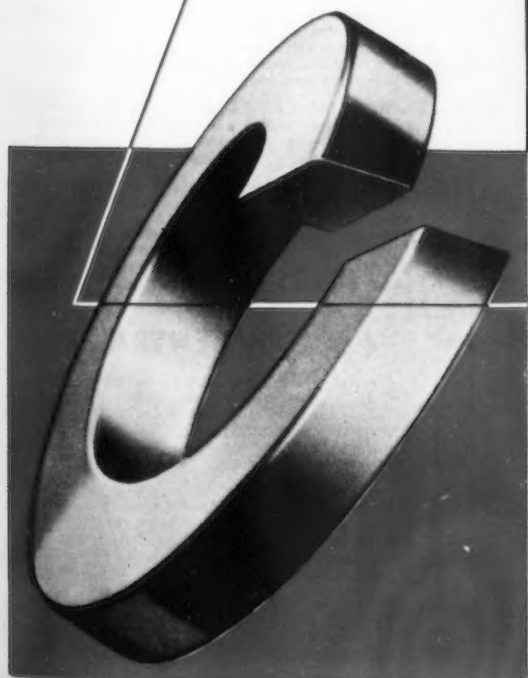
◀ SOUTH ATLANTIC ▶

Jones Machinery Co., Bishop Street, N.W., Atlanta, Ga., plans one-story addition, 60 x 65 ft. Cost about \$35,000 with equipment.

Brunswick Pulp & Paper Co., Brunswick, Ga., recently organized by officials of Mead Corp., Chillicothe, Ohio, manufacturer of paper products, has engaged George F. Hardy, 305 Broadway, New York, consulting engineer, to prepare plans for mill at first noted place, comprising several units for pulp production, bleaching, storage and distribution, with power house, machine shop and other mechanical departments. Cost over \$1,500,000 with machinery. Scott Paper Co., Chester, Pa., is interested in project. Charles R. Van de Carr, vice-president of Mead Corp., noted, is president of new company; Ed-

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ward S. Wagner, first vice-president and treasurer of Scott company, is vice-president and treasurer.

◀ WASHINGTON DIST. ▶

Cecil County Board of Education, Elkton, Md., plans manual training department in new two-story high school on local site, for which bids are being asked on general contract. Cost \$180,000. Financing has been arranged through Federal aid. Martin & Jeffers, duPont Building, Wilmington, Del., are architects.

Birtcherd's Dairy, Inc., Monticello Avenue and Princess Anne Road, Norfolk, Va., has let general contract to R. R. Richardson & Co., National Bank of Com-

merce Building, for two-story milk products processing plant, 80 x 125 ft. Cost over \$100,000 with equipment.

LaMotte Chemical Products Co., McCormick Building, Baltimore, manufacturer of industrial chemicals, plans addition to plant on York Road, near Lutherville, Md., where 10-acre tract recently was acquired. Initial units will cost over \$50,000 with equipment.

Crown Cork & Seal Co., Inc., Eastern Avenue and Kresson Street, Baltimore, has arranged for a stock issue of 106,717 shares, no par value, a considerable part of proceeds to be used for expansion in plant of Crown Can Co., Philadelphia, a subsidiary, including additional equipment.

Board of Education, Waynesboro, Va., plans manual training department in new

two-story high school, for which bids will be asked soon on general contract. Cost \$245,000 with equipment. Financing has been arranged through Federal aid. Smithey & Boynton, 112 Kirk Avenue West, Roanoke, Va., are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 17 for 66 six-cylinder marine-type diesel engines, each 105 hp., and spare parts (Schedule 9152) for Norfolk, Va., Navy Yard; 1380 hand drills (Schedule 9157) for Puget Sound, Wash., and Eastern yards; until Nov. 27, scoops and shovels (Schedule 9027) for Eastern and Western yards.

◀ WESTERN PA. DIST. ▶

American Cyanamid & Chemical Corp., Bridgeville, Pa., manufacturer of industrial chemicals, has let general contract to Rust Engineering Co., Clark Building, Pittsburgh, for two one-story additions. Cost close to \$100,000 with equipment. Main offices are in New York.

American Steel Foundries, Thirty-sixth Street, Pittsburgh, plans modernization and improvements in foundry at Verona, Pa., closed for several years, including installation of new equipment. Company headquarters are at Chicago.

Owens-Illinois Glass Co., Ohio Building, Toledo, has let general contract to Hughes-Foulkrod Co., Schaff Building, Philadelphia, for one-story addition, 220 x 325 ft., to works at Huntington, W. Va., where additional land recently was acquired, primarily for storage and distribution. Cost over \$100,000 with equipment.

◀ SOUTHWEST ▶

Anheuser-Busch, Inc., 721 Pestalozzi Street, St. Louis, has let general contract to Fruin-Colnon Contracting Co., Merchants Laclede Building, for seven-story addition to brewery, 90 x 100 ft., primarily for a fermenting division. Cost close to \$500,000 with equipment. Company also recently made award for six-story addition for storage and distribution.

City Council, Coffeyville, Kan., will take bids soon for extensions and improvements in municipal electric power plant, including new 5000-kw. steam turbo-generator unit and auxiliary equipment. Cost about \$200,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Kay County Electric Co-operative Association, Newkirk, Okla., plans about 300 miles of transmission and distributing lines for rural electrification with power substation and service facilities. Fund of \$300,000 has been arranged.

City Council, Poplar Bluff, Mo., plans extensions and improvements in municipal power plant and waterworks station, including new equipment. Cost about \$40,000. Fund in that amount has been secured through Federal aid. W. A. Fuller Co., 2916 Shenandoah Avenue, St. Louis, is consulting engineer.

Pure Oil Co., 35 East Wacker Drive, Chicago, has begun construction of addition to oil refinery at Smiths Bluff, near Port Neches, Tex. Cost over \$100,000 with equipment.

North Texas Traction Co., Sinclair Boulevard, Fort Worth, Tex., plans remodeling two-story car barns at 1600 East Lancaster Street, for new repair shop for motor buses, including garage facilities. Cost about \$45,000 with equipment.

◀ SOUTH CENTRAL ▶

United Collieries, Inc., Carew Tower Building, Cincinnati, has asked bids on general contract for coal-loading dock on Ohio River at Catlettsburg, Ky., with conveying system, loaders and other mechanical-handling equipment. Cost over \$200,000 with machinery.

Memphis Butchers' Association, Memphis, Tenn., has let general contract to Fred J. Sexton Co., Dermon Building, for new one-story abattoir and packing plant, 100 x 125 ft. Cost close to \$100,000 with equipment.

Standard Slag Co., Ashland, Ky., plans rebuilding plant recently destroyed by fire. Loss estimated close to \$100,000 with crush-



Holds paint or enamel to steel or iron. Prevents rust. ★
Saves time on processing (either tank or spray system).
★ Saves on equipment space. ★ Saves on fuel and heating
of tanks. ★ No sludge. ★ Has passed salt spray and humidity
tests. ★ Gives controlled etching—light or heavy. ★ Has
been commercially tested. ★ Has been officially approved
by several of Detroit's largest industrial plants.

WRITE FOR FREE DATA OR FOR DETAILS FOR MAKING
FREE TEST



Bonding Process CORPORATION
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How Snap-On Tools Jumped Production

SNAP-ON TOOLS, INC., of Kenosha, Wis., manufacture high grade wrenches and a complete line of mechanic's hand tools.

To improve quality and speed up production in their plant, this company recently installed a National Acme Model R Six-Spindle Automatic Screw Machine. It is being used in making socket blanks from S.A.E. 4150 steel. And it is turning out parts three times faster than older machines running on the same type of work!

Better machining is possible. Down time is minimized. Cutting tools last longer.

Our engineers have proved to many manufac-

turers that new model National Acme machines pay their own way. We'll be glad to show you the records. Perhaps we can save money for you, too. Why not investigate now? Address

The National Acme Company, Cleveland, Ohio

DIVIDENDS EARNED

Here's a corporation investment that is not affected by politics, inflation or international monetary manipulation. We refer to investments in 1936 model machine tools. Our machines must pay for themselves and earn a dividend in addition. They are sold on that basis. Would you like a prospectus of the offering?

ACME

GRIDLEY AUTOMATICS

ing machinery and other equipment. Company headquarters are at Youngstown, Ohio.

Board of Education, Lexington, Ky., plans manual training department in new two-story junior high school. Cost close to \$200,000. Financing has been arranged through Federal aid. Frankel & Curtis, Hernando Building, are architects. H. H. Hill is school superintendent.

Common Council, Newbern, Tenn., plans early call for bids for new municipal electrical distributing system, with service facilities. Transmission line will be built for connection with system of Tennessee Valley Authority. L. O. Brayton Engineering Co., Dyersburg, Tenn., is consulting engineer.

Swift & Co., Union Stock Yards, Chicago, plan new two-story plant, 120 x 225

ft., for commercial fertilizer division on site now being selected at Birmingham, with smaller structure adjoining. Cost over \$50,000 with equipment.

◀ OHIO AND INDIANA ▶

Angell Nail & Chaplet Co., 4580 East Seventy-first Street, Cleveland, manufacturer of steel nails and other wire products, has asked bids on general contract for one-story addition, 90 x 100 ft. Cost close to \$50,000 with equipment. Edward A. Weiland, 14236 Euclid Avenue, is engineer.

Chase Brass & Copper Co., 5005 Superior Avenue, Cleveland, has let general contract to Austin Co., 16112 Euclid Avenue, for two one-story additions to mill on Babbitt Road, 60 x 200 ft., and 20 x 200 ft., for

storage and distribution. Cost about \$50,000 with equipment. Main offices are at Waterbury, Conn.

Harris-Seybold-Potter Co., 4510 East Seventy-first Street, Cleveland, manufacturer of printing machinery and parts, has let general contract to Gilmore-Carmichael-Olson Co., 1873 East Fifty-fifth Street, for one-story addition, 100 x 100 ft. Cost close to \$75,000 with equipment.

City Council, Delphos, Ohio, plans new municipal electric light and power plant, and distributing lines. Cost about \$400,000. Financing is being arranged through Federal aid. Carl Simon, Van Wert, Ohio, is consulting engineer.

Ohio Carbon Co., 12508 Berea Road, Cleveland, manufacturer of resistors and other electrical specialties, has work under way on two-story unit, 60 x 60 ft., two one-story structures, 80 x 100 ft., and 50 x 80 ft., respectively, and boiler house. Cost over \$90,000 with equipment. George S. Rider Co., Marshall Building, is architect and engineer.

Egry Register Co., 417 East Monument Avenue, Dayton, Ohio, manufacturer of manifold and other register devices, has asked bids on general contract for one-story addition, 81 x 140 ft., primarily for storage and distribution. Cost close to \$45,000 with equipment. Schenck & Williams, Third National Bank Building, are architects.

Penn Electric Switch Co., Twentieth and Walnut Streets, Des Moines, Iowa, has let general contract to Austin Co., Cleveland, for two-story branch plant, about 85,000 sq. ft. floor space, at Goshen, Ind. Cost over \$175,000 with equipment. Albert Penn is president.

Noble County Rural Electrification Membership Corp., Albion, Ind., M. E. Black, treasurer, recently organized, plans transmission and distributing lines for rural electrification in parts of Noble County, totaling close to 300 miles, with service facilities. Fund of \$300,000 has been secured through Federal aid. Work is scheduled to begin soon.

◀ MIDDLE WEST ▶

Caine Steel Co., 1811 South Fifty-fifth Avenue, Cicero, Chicago, iron and steel merchant, has leased one-story building, about 40,000 sq. ft. floor space, to be erected by Phipps Industrial Land Trust, Inc., Chicago, on North Central Avenue, for new storage and distributing plant. Company has taken option to purchase structure later. Cost close to \$90,000 with mechanical-handling and other equipment.

Barber-Colman Co., Loomis Street, Rockford, Ill., manufacturer of hobbing machines and hobs, milling cutters, special machinery and parts, has let general contract to Security Building Co., 717 East Jefferson Street, for one-story addition, 90 x 150 ft. Cost over \$40,000 with equipment.

Sherwin-Williams Co., Cottage Grove Avenue and East 115th Street, Chicago, manufacturer of paints, oils, varnishes, etc., has asked bids on general contract for four-story addition, 100 x 200 ft. Cost over \$125,000 with equipment. Company headquarters are at Cleveland.

Continental Oil Co., 1018 South Second Street, St. Paul, Minn., will begin work at once for one and two-story bulk oil storage and distributing plant on University Avenue. Cost close to \$85,000 with steel tanks and other equipment. Company district offices are at Ponca City, Okla.

Gates Rubber Co., 999 South Broadway, Denver, manufacturer of mechanical and other rubber goods, has plans for four-story addition, 125 x 205 ft., primarily for storage and distribution. Cost over \$75,000 with equipment. William N. Bowman Co., Insurance Building, is architect.

City Council, Forest City, Iowa, has engaged Young & Stanley, Inc., Muscatine, Iowa, consulting engineer, to prepare plans for new municipal electric power plant and distributing lines. Cost about \$165,000. Financing will be arranged through Federal aid.

H. A. Framburg & Co., 3320 West Carroll Street, Chicago, manufacturers of electrical fixtures and equipment, have plans for one-story top addition to plant, 80 x

TRIAL OFFER

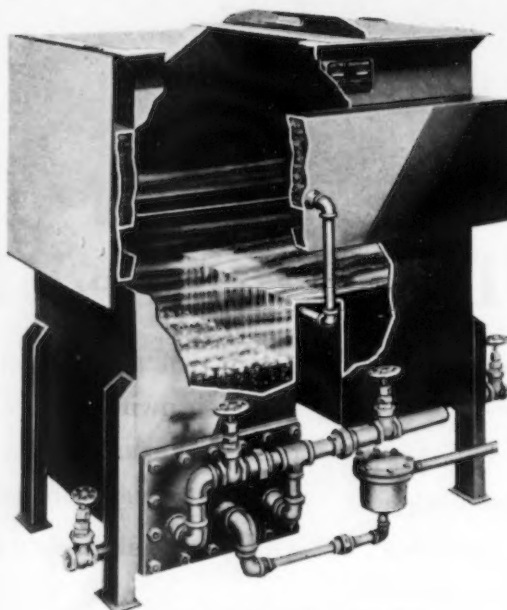
of a DETREX DEGREASER

Try a standard Detrex Degreasing Machine... in your own plant, on your own production... for three weeks without capital investment.

The great saving in your cleaning costs, with better quality of product, will thus be proved.

See how simply and efficiently this machine removes oil, grease, drawing compounds, and polishing and buffing materials from all kinds of metal products.

It is preferred as the best method of cleaning prior to bonderizing, granodizing, plating, enameling, painting, lacquering, and the close inspection of machined parts.



Steam Heated Detrex Degreaser. Piping shown on front of machine is supplied by user.

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You make the decision regardless of the test results.

This free offer is made because of our experience with hundreds of satisfied customers—using Perm-A-Clor and Triad safety solvents and Detrex Degreasers.

TELL US NOW WHERE AND WHEN TO SHIP THE UNIT. Your only expense will be the small transportation charges and the solvent used.

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DETREX DEGREASERS • ALKALI CLEANERS • DEGREASING SOLVENTS

Two Dramatic Demonstrations

... WHAT DO THEY MEAN?



OVER a ten-year period we have invited finishing materials consumers to twist and bend cold-rolled steel and brass strips coated with Blue Knight Flexible Finishes. Some six months ago, we introduced the Crash Test, wherein steel tubes finished with our materials could be banged together forcibly without injury to the coating. We claimed No Chipping . . . No Flaking . . . No Peeling!

These two "non-technical" demonstrations indicate the superlative degree of Flexibility and Adhesion built into our products as a cost and service safeguard.

In fabricating and assembly operations, this wide safety-zone of Flexibility and Adhesion eliminates rejects and expensive refinishing. In shipping and warehousing, rough or abusive handling does not result in marred finishes. On aging, either in storage or in dealer's hands, no brittling of the finish occurs. There is No Chipping . . . No Flaking . . . No Peeling!

All of this interprets the dollar value of permanent *Flexibility* and permanent *Adhesion*. These star-points must be embodied in every specification finish engineered by the Roxalin laboratory which we

proudly refer to as "the heart of our business." You find them in Roxalin enamels and clears whether air-dry or bake, cellulose or synthetic.

Write for this non-technical presentation of some important technical accomplishments.

Roxalin Flexible Lacquer Co., Inc.,
800-2 Magnolia Ave., Elizabeth, N. J.



See our display in the exhibition quarters of the Metals & Plastics Bureau,
3rd Floor, International Building, Rockefeller Center, New York City.

ROXALIN *Flexible* FINISHES

**CELLULOSE & SYNTHETIC TYPES
ENGINEERED FOR SPECIFIC PERFORMANCE**



ACID RESISTANT CHAIN SLINGS of AMPCO METAL

are steadily gaining in popularity because of

1. High tensile strength.
2. Great resistance to corrosion.
3. 20% less weight than ordinary bronze chains.

Ampco chain is integral-cast for metal uniformity and for the elimination of oxide focal points for rapid corrosive attack.

AMPCO METAL, Inc.

MILWAUKEE, WISCONSIN

100 ft. Cost over \$45,000 with equipment. Robert H. Salisbury, Wheaton, Ill., is architect.

Pheoll Mfg. Co., 5700 Roosevelt Road, Chicago, is erecting a two-story addition. 75 x 300 ft., for general offices, finished products and packing and shipping departments.

Wisconsin-Appleton Co., South Milwaukee, Wis., has placed general contract with Austin Co., Cleveland, for foundry extension, 80 x 180 ft. Cost about \$75,000 with equipment.

Board of Vocational Education, Racine, Wis., has received a PWA grant of \$125,000 toward third unit of vocational school plant to cost about \$278,000 with equipment. Frank J. Hoffman, Janes Building, local, expects to complete plans by Jan. 1. Thomas S. Rees is director.

Dane County Board, Madison, Wis., rejected former bids and will close new bids, Nov. 13, for construction of garage, maintenance shop and warehouse, 80 x 400 ft., for highway department. Cost is estimated at \$85,000. A. N. Johnson is county clerk.

City Council, Clintonville, Wis., has engaged J. F. Dreger, architect, Oshkosh, Wis., to design machine shop, 50 x 150 ft., one-story, for occupancy by Utility Tool & Body Co., now being organized to manufacture motor truck and other equipment. A. A. Washburn is mayor.

J. J. Plank & Co., North Clark Street, Appleton, Wis., have started work on machine shop extension, 30 x 80 ft., for manufacture of rolls and other papermill equipment.

Line Material Co., South Milwaukee, Wis., manufacturer of electric transmission devices and supplies, is considering plans by A. J. Hoynacke, company engineer, for engineering and manufacturing addition, 40 x 120 ft., three stories.

Milwaukee Brewers' Specialty Co., 541 West McKinley Avenue, Milwaukee, manufacturer of tapping equipment, has taken additional space at 1244-1248 North Sixth Street for enlarging production. Fred Kornburger is proprietor.

◀ MICHIGAN DISTRICT ▶

Anaconda Wire & Cable Co., Muskegon, Mich., has let general contract to Strom Construction Co., Grand Rapids, for one-story addition. Cost close to \$50,000 with equipment. Company headquarters are in New York.

Precision Spring Corp., 5900 Federal Street, Detroit, has work under way on one-story plant unit at Woodrow Wilson and Puritan Avenues, about 62,000 sq. ft. floor space, for production of mechanical spring specialties. Cost close to \$100,000 with equipment.

Norge Corp., Muskegon, Mich., manufacturer of electric refrigerator units, plans rebuilding part of plant recently destroyed by fire. Loss over \$150,000 with equipment. Company is a division of Borg-Warner Corp., Chicago.

Dixie Oil Refining Co., Detroit, now being organized by R. H. Montgomery, Detroit, and Dr. George G. Brown, professor of chemistry, University of Michigan, Ann Arbor, Mich., has selected about 100-acre tract at Riverview, near Detroit, for new oil refinery of several units, with steel tank storage and distribution division, power house and other structures. A division will be installed for gasoline production. Entire project will cost close to \$750,000 including equipment. Company will take over local docks and waterfront property now being used by Dixie Fuel Co. for loading and distributing service.

McInerney Spring & Wire Co., Grand Rapids, Mich., manufacturer of automobile springs and other steel springs and wire goods, has leased former six-story mill of Passaic Worsted Spinning Co., Passaic, N. J., and will remodel for Eastern branch plant.

◀ PACIFIC COAST ▶

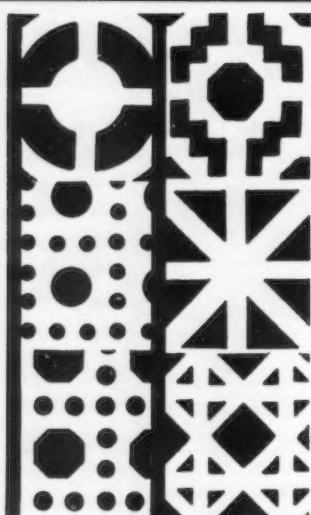
Echlin Mfg. Co., 799 Golden Gate Avenue, San Francisco, manufacturer of ignition equipment and parts, has let general contract to Cahill Brothers, 206 Sansome Street, for new three-story plant unit, 100 x 140 ft. Cost over \$85,000 with equipment. W. D. Peugh, 333 Montgomery Street, is architect; F. W. Kellberg, 320 Market Street, is consulting engineer.

Petersen Showcase & Fixture Co., 5700 South San Pedro Street, Los Angeles, has plans for one-story shop addition, 44 x 125 ft. Frank L. Stiff, Park Central Building, is architect.

Shell Oil Co., Seattle, has acquired about seven acres adjoining bulk oil storage and distributing plant at West Seattle, for additional units, including steel storage tanks, increased pumping equipment and other operating facilities. Cost about \$250,000 with equipment.

City Council, Sandpoint, Idaho, plans municipal hydroelectric power plant on Priest River and is arranging bond issue of \$50,000 for initial work. Entire project will cost close to \$150,000 including transmission line to city. Financing will be carried out through Federal aid.

General Paint Corp., 1406 Dearborn Avenue, Seattle, has let general contract to Austin Co., Dexter Horton Building, for rebuilding of paint, oil and varnish plant, recently destroyed by fire. Cost close to \$100,000 with equipment. Main offices of company are at San Francisco.



NEW DESIGNS

Send for this folder, "Wissco Decorative Perforated Metals." It shows scientifically planned designs offering both greater free air openings and concealment.



WICKWIRE SPENCER STEEL CO., 37 East 42nd St., New York
BUFFALO WORCESTER CHICAGO SAN FRANCISCO

WICKWIRE SPENCER perforated metals

JUST BETWEEN US TWO

Blurb

TALES told us about the antiquity of the records maintained by English business concerns always awe us. If, for example, you should ask Messrs. Stoke-Poges, Ltd., Sheffield, what type of axe they sold Henry VIII in 1536 to cut off Anne Boleyn's pretty head, they would casually flip a ledger, and reply, "That was our stock Model No. 117-B warranted dripless, price two quid, three shillings, ha'penny."

We bemoan the fact that concerns in this country have so little respect for old records. Only a couple of days ago we had occasion to dig through our circulation archives to see whether any October in the history of *The Iron Age* equalled the month just past in number of new subscribers. We couldn't find anything older than 1920. So all we can do in honesty is to claim a 16-year record.

Einsteins Deplore Puerile Problems

OUR public responded nobly to the fish problem of Oct. 29 and swamped us with the solution (48 in.) via mail and telephone. Most answers were accompanied by sour comments on the puerility of the problem, causing us to bow our head low in shame. Our Caesars feed on strong meat and will surely demonstrate in sixty seconds flat the unfairness of this question, picked up from an unknown source:

Smith drives to town 4 miles distant. The first two miles he drives 30 miles per hour, the third mile 15 miles per hour. How fast will he have to drive the fourth mile to average 30 miles per hour for the trip?

After you have insulted your mind with that you might while away five minutes with this trifle sent in by A. D. Williams:

On a straight base line 200 units long, at 100 units from either end an arc with a radius of 50 units is struck. From the end of this radius two lines with an included angle of 130 deg., diverge to the ends of the 200-unit base line. What is the length of either line from the end of the radius to the end of the base line, and give analytical proof.

Bald Orchid

WHILE we have never sympathized with the Oberleutnant in his squeamishness about the use of superlatives, we do feel that this comment made at a recent convention could have been phrased a bit more suavely, but who are we to tamper with a captain of industry's direct statement?:

"The Iron Age is doing a bigger and better job than any other publication in the industry."

Headliners

"THE Proprietor Eats in Another Restaurant"—Allis Chalmers.
"He Makes the Belt Swallow Its Tail."—Goodrich.

A bouquet to Mr. Child, creator of that beautiful painting in Bethlehem's advertisement on page 19 of the Nov. 5 *Iron Age*. Another to the creator of AT&T's striking advertisement on page 135 of the same issue.

He Made 'Em Loud

A SOUTHERN gentleman boasts to us, "My father made the loudest sounded bells that ran on the Rail Road here and Church bells." Which brings to mind East Hampton, Conn., as an example of the gregariousness of industry. That far from gigantic town harbors five bell manufacturers.

The huddling instinct in business is strong. Here in New York City the fur houses congregate in one area, the copper workers in another, the theaters are bunched, so are the brokerage houses; the shoe wholesalers flock together; the cloak and suiters are as close as puffed wheat grains in a bowl of milk.

At first thought it would seem wiser for a business to be off by itself where competition was thinner, but the buyer prefers those areas where sources of supply are most numerous. Which is probably one of the reasons why *The Iron Age*, the heaviest carrier of industrial advertising, is also the most widely read.

Anti-Backscratchers

THAT anonymous and profanely captioned philippic on business swapping, "Reciprocity Be Damned!" in the Sept. 24 *Iron Age* has made a name for itself. The number of reprints ordered exceeds by many times the combined electoral votes of both parties, and you can throw in Lemke, too, for good measure.

—A. H. D.



WHAT PRICE Experience?

What price YOUR Hacksaw experience? Is it costing more than it's worth? Here is what users are saying about Atkins Silver Steel Blades:

... "We have found them far superior to any other, and through them have cut down our costs considerably." ... "Without any reservation—your hacksaw blades are the best we have ever used" ... "We are always on the lookout for better tools. We are still using Atkins Silver Steel Hacksaw Blades."

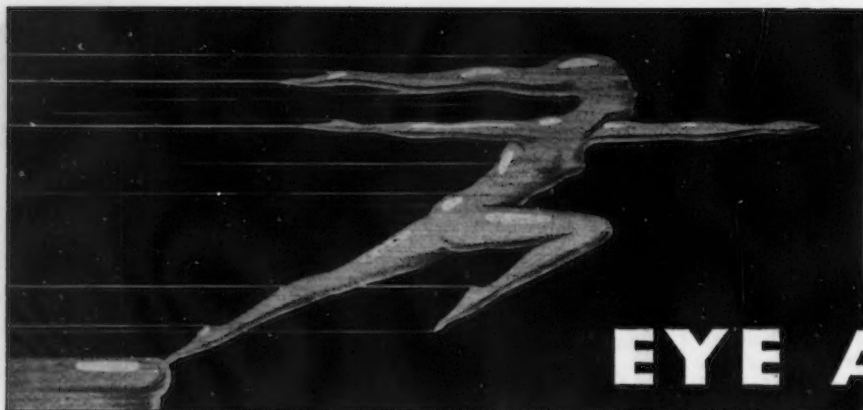
Experience has proved that Atkins Hacksaw Blades will cut more metal faster, easier and better than any other blade on the market.



E. C. ATKINS AND COMPANY
406 S. Illinois Street, Indianapolis, Indiana

ATKINS Silver Steel SAWS

A FAMILY OF CHAMPIONS



EYE APPEAL

DURABILITY

AND LOWER COST

You get all three when you plate metal parts with

GRASSELLI

CADALYTE

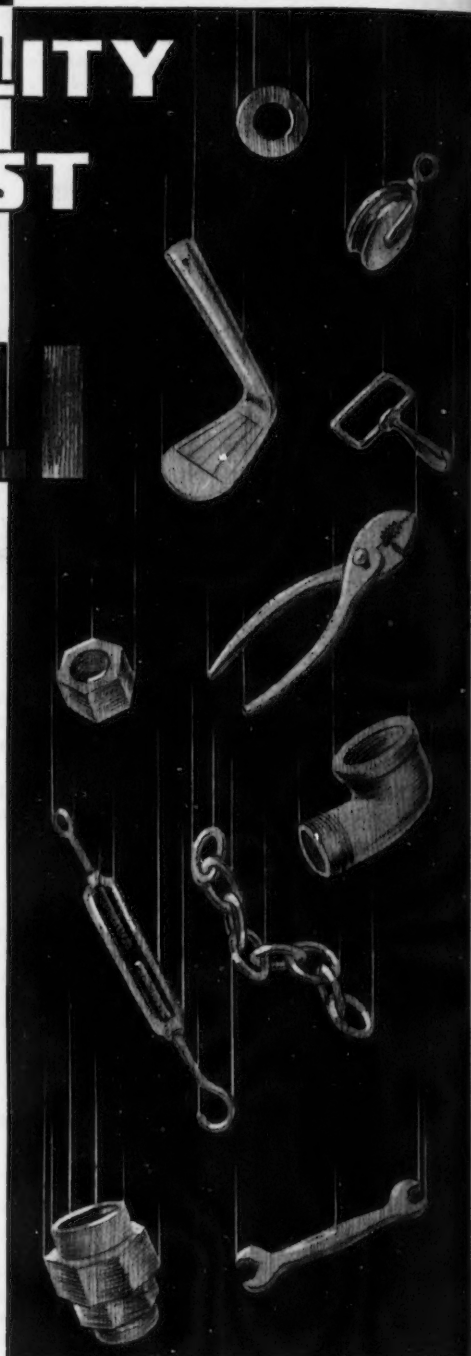
THE CADALYTE* Process of cadmium plating provides a maximum degree of rust-protection. It affords complete protection of iron and steel products by an electrodeposit of 100% pure metal. It assures a rust-proof coating which embodies the desirable characteristics of brilliancy, density, ductility and absolute adherence.

The stability of the CADALYTE solution, its high throwing power, low resistance, high and equal cathode and anode current efficiencies, its ability to accommodate high current densities, and its simplicity of maintenance, all contribute to effect economies which make the CADALYTE Process outstanding in the field of metal finishing. Write for further information.

* Trade Mark Registered

GRASSELLI BRIGHT ZINC

An electroplating zinc process which produces a brilliant finish, an excellent protection against rust, with the advantages of economical zinc plating.



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